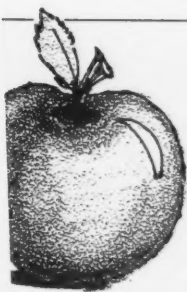


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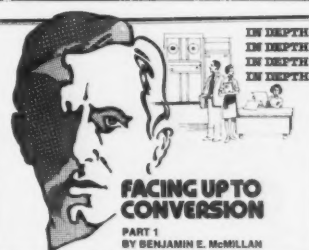
ITS: FOR THE REST  
THE BIG APPLE,  
PAGES 10 AND 11

### Data Base Processors: What Can They Do?

By Eugene Lowenthal

IN DEPTH  
IN DEPTH

ON THE INSIDE:



### FACING UP TO CONVERSION

PART 1  
BY BENJAMIN E. McMillan

THREE IN DEPTHS

### TGIF Algorithms

By R. A. Cornish

IN DEPTH  
IN DEPTH  
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FOLLOW PAGE 84

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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## Univac Takes It Slow — But Very, Very Steady

By Marcia Blumenthal  
CW Staff

BLUE BELL, Pa. — Univac claims to hold the No. 2 spot in the computer industry.

While that claim may be hotly disputed by Burroughs Corp. and Honeywell, Inc., Univac last year

*During the next several weeks, Computerworld will profile each of the five companies recognized as IBM's traditional competitors in the general-purpose mainframe market, focusing on where they stand now and how they intend to compete in the 1980s.*

rated second after IBM in mainframe shipments, with \$950 million worth, according to estimates by International Data Corp.

Because Univac, a division of Sperry Rand Corp., and other second-place contenders base their rankings on a variety of industry statistics, a determination (Continued on Page 6)

## Wealth of Product Debuts Marks Start of NCC Today

By E. Drake Lundell Jr.  
CW Staff

NEW YORK — A cornucopia of products was introduced here today as the National Computer Conference opened for a four-day run in the Coliseum.

Both Univac and Harris Corp. used the occasion to announce mainframes, while Intel Corp. and Dataproducts Corp. showed new peripherals and Texas Instruments, Inc. added to its terminal line.

And, Honeywell introduced a new Page Processing System and a family of microprocessor-based CRT terminals.

TI, Lear Siegler, Inc. and Applied Digital Data Systems, Inc. sparked interest in the minicomputer and small business arena with new products (see story on Page 5).

Of interest to larger system users, the Intel Corp. Fast Access Storage Technology (Fast)-3805 is the first semiconductor random-

access memory (RAM) designed to replace mechanical disk systems. The unit emulates either the IBM 2305/2835 fixed-head disk system or the IBM 3350/3830 moving-head disks.

Users can triple disk traffic without adding channel or controller capacity because of the higher access times and transfer rates available with the semiconductor devices, Intel said.

Both Storage Technology Corp. and Memorex Corp. have brought out disk replacement products that use semiconductor materials in whole or in part, but their units are based on charge-coupled devices (CCD) and not the RAM units.

By using industry-standard 16K-bit RAMs instead of 64K-bit CCDs, Intel said it could provide faster access and transfer capabilities and more storage and controllers per system.

At the same time, the firm claimed that the 16K RAM had proven reliability and fewer single-bit errors than CCDs and that the use of 16K RAMs eliminates the risk of channel overruns, which are possible with serial devices like the CCD.

The solid-state disk will be particularly suited to applications where users are I/O-bound because of the heavy use of MVS, TSO and IMS or high-activity, on-line applications, Intel said.

The units can store 12M to 72M bytes with a maximum access time of .4 msec; the standard Fast-3805 data transfer rate is 1.5M- to 2M byte/sec depending on the CPU channel and

(Continued on Page 4)

## Huge Memories Anticipated IBM H Series Expected by Early '80

By E. Drake Lundell Jr.  
CW Staff

ARMONK, N.Y. — IBM's H series computers are coming.

And just as the E or "entry" series of computers sent shock waves through the medium and low ends of the computer community, the H or "high-end" machines for larger system users are sure to send price/performance levels reeling.

The first models of the H series are expected by early next year, although all four models in the planned line will probably not be available at the same time.

Featuring huge main memory sizes, radical hardware price reductions, increased unbundling of operating system components and a new memory addressing scheme, the systems will probably be announced in a top-to-bottom fashion with the largest machine coming first and the smaller units following during the next year.

At the same time, IBM is now planning to fill in the 4300 series with two new models, the first of which is expected momentarily. Dubbed the 4336, the unit will fit roughly between the 4331 and 4341, which were announced in January [CW, Feb. 5].

The second new member of the 4300

family is scheduled for introduction later this year or early next year and will be above the 4341 in performance.

The most likely first model in the H series will be the H3 or M unit, as it is known among industry prognosticators. It probably will be announced

(Continued on Page 2)

## Airline Simulating Flight 191's Last Takeoff

By Tim Scannell  
CW Staff

FORT WORTH, Texas — While Federal Aviation Administration officials sift through the wreckage of American Airlines Flight 191 at Chicago's O'Hare International Airport, experts here are using computers to reenact what is being called the worst aviation disaster in U.S. history.

It is hoped that the computers, connected to a series of flight simulators at American's Flight Academy, will du-

plicate the exact conditions of the ill-fated DC10 jumbo jet as it lost its left engine and plummeted to the ground. At least 274 people — all of those on board and two people on the ground — died as the crippled plane crashed onto a deserted field near Chicago's busy airport.

"Just what will come of all this, we don't know," American Airlines spokesman John Raymond stated. "We program into those simulators virtually every situation that a pilot might

encounter in the air," but "we never had a [computer] program to cover an engine falling off the airplane on take-off."

American Airlines was asked to conduct the "very complicated testing procedures" by the National Transportation Safety Board (NTSB), which is overseeing the piecing together of the last operational minutes of the California-bound flight. Using structural data supplied by the McDonnell

(Continued on Page 8)



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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

## OTHER EDITORIAL OFFICES: West Coast:

407 California Avenue, Suite 10, Palo Alto, California 94306. Phone: (415)328-8064. Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718. England: Steve Burton, IDG Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: 01-267 1201. Telex: 851 264737. W. Germany: CW Publikationen, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 34-90-61. Telex: 5215350. Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J242461. Australia: John P. Costello, Computerworld Pty. Ltd., 3 Bruce Street, Crows Nest, NSW 2065. Phone: 929-5388. Telex: SECCO AA25468. Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 242-7395 or 263-8046. Telex: 11-32017(WORD BR).

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# H Series Expected by Early '80

(Continued from Page 1)

during the first quarter of 1980, although announcement could come as soon as the last quarter of this year, according to sources.

The unit will have enormous processing power — estimated to be as much as 15 million instructions per second (Mips) compared with the current top of the line, the 3033, with a rating of 5 Mips.

At the same time, main memory will take a quantum leap — from a present maximum of 16M bytes on the 3033 to as much as 96M bytes on the top-of-the-line H series processor, although typical configurations will probably have "only" half that maximum capacity — at least at first.

Presently, the 4341 has a maximum memory of 4M bytes and a Mips rating of .88, according to Robert Fertig, director of the Technology Analysis Group at Advanced Computer Techniques Corp. This gives a memory-to-Mips ratio of around 5:1, so by multiplying out the 15 Mips of the expected H processor, memory would have to be at least 75M bytes.

On the larger processor, however, IBM is expected to increase the memory-to-Mips ratio to approximately 6:1 for the huge memory sizes.

## Memory Addressing Scheme

IBM will have to turn to a completely new memory addressing scheme because of the large memories. The firm presently uses 24-bit addressing, which permits direct addressing of up to 16M bytes.

Most likely, the H series systems will

use a 32-bit address, which would yield a 4.295 billion-byte address space, observers noted, more than enough for the projected large systems of the 1980s.

In addition, the large memories on the systems may be made from relatively slow circuits, several sources said, leading to the conclusion that IBM will implement a large cache for the H series computers. In fact, the firm may turn to a two-level cache memory hierarchy in order to boost memory access speeds.

The H series will probably be the first of the IBM systems to permit "heterogeneous" multiprocessing, Fertig's group predicted. In such a system, two — or possibly more — processors with different Mips ratings could be linked. For example, a processor rated at 4 Mips could be linked to one rated at 6 Mips in order to produce a 10 Mips system.

## Move Toward Separation

The H series eventually will feature processors for specific functions, such as communications front-end and data base back-end processors, the industry watchers agreed, but these may not be introduced with the initial systems.

The IBM move toward separating parts of the operating systems into program products — emphasized on the 4300 series — will continue with the H series. While the 4300 announcement implemented this policy in regard to disk-oriented operating systems, the H series software announcements will continue it with the larger operating systems.

At the same time, several industry watchers indicated that IBM will try to move users through a "graceful migration" from their 370 operating systems into a new environment. Like the 4300, the H series machines will run in 370-compatible mode and also in an Extended Control Program Support mode, which will provide faster throughput for users willing to change some of their 370 programs.

## Concepts From System/38

Many of the concepts employed in the System/38 — such as one-level memory management — are expected to be used on the H series machines.

In addition to the top-of-the-line unit, observers expect three more general-purpose processors in the H family.

The smallest will have a Mips rating of about 3 and maximum memory of about 16M bytes, although the average memory will be about 8M bytes. It will carry a total price tag of around \$1 million, although the hardware-only price may be lower.

The next unit will run around 6 Mips in processing power with a 32M-byte total capacity although, again, the typical configuration will be about half of that. The unit, not expected until late 1980 or early 1981, will sell for about \$2 million.

The third unit in the series will have about a 10 Mips rating and a top memory capacity of about 48M bytes, although once again, the average user will have about half the main memory capacity at first. It will cost about \$3 million to \$4 million.

# On the Inside This Week

## NEWS

- Small System Users See Plenty of Action at NCC . . . 5
- Only Five of Seven Original Industry Dwarfs Left . . . 7
- DPers at United Airlines Back in the Friendly Skies . . . 8
- SSA Sends Garbled Bills to 30,000 Retirees . . . 9
- IBM 'Bugging' New Building to Manage Energy . . . 12
- Mini Plays Doctor for Air Traffic Controllers . . . 14
- Stress Studied as Culprit in Air Controller Illness . . . 15
- Law Enforcers to Learn Techniques of DP Crime . . . 16
- FCC Reconsidering GTE/Telenet Merger Terms . . . 17
- R.I. Joins List of States Adopting DP Crime Bills . . . 18
- AAA Prefers to Chart Gasoline Level Manually . . . 19
- DP Center Escapes Ruin by Fire, Then Water . . . 20
- Program Error Delays Tax Return Processing . . . 21
- Glassner Pleads Guilty to Billing Scheme . . . 24
- Communications Industry Hits Post Office EMS . . . 25
- Bloomie's Shoppers Access Jewish History Data . . . 26
- Artist Making Go of Media Firm Based on DP . . . 27
- IBM 8100, System 38 Found Confusing Users . . . 28
- Three ATMs Robbed of Almost \$100,000 . . . 29
- Technique Aids Forecasting of Political Crises . . . 30
- Space Shuttle on Target Despite Software Delay . . . 32
- Desert Town Gives Birth to Fertile T/S Business . . . 34

## EDITORIAL

- Editorial: Kudos to Codasyl . . . 50
- Operator's Job Can Be Creative, Satisfying . . . 51
- Human Connection: 'Cronyism' Drives Out DPer . . . 51
- Modus Operandi Key to Successful MIS . . . 51
- Women vs. Chauvinism: A DP Showdown . . . 52
- Taylor Report: Public Terminal Failure . . . 53

## SOFTWARE & SERVICES

- DDP and Productivity Need Attention . . . 61
- Maintain DBMS Control, Management Urged . . . 62
- Package Provides 'Datacom/DB' Encryption . . . 63
- Oil Producer Accounting Includes Customization . . . 65
- 'LHF' Runs IBM-Based Table Updates, Searches . . . 65
- A/V Materials Seen More Current Than Texts . . . 67

## COMMUNICATIONS

- Phone Company Blasted for Net Snags . . . 69
- Report Gives Details, Ratings of 277 CRTs . . . 70
- Specialty Chain Finds POS More Than Stylish . . . 75
- Memorex Enhances 1270 Control Unit . . . 76
- Program Trains Operators . . . 77
- Wang Gain Communications Controller . . . 78
- National Semi Enhances Datachecker POS Line . . . 80
- RCA Service Gives Users 56K-Bit Data Streams . . . 81

## SYSTEMS & PERIPHERALS

- Patent Granted for Data Reading Method . . . 85
- COM-Generated Fiche Tames Paper Monster . . . 87
- Hospital Gears Up to Handle Required Reports . . . 89
- Utility Approaches Upgrading With Caution . . . 89

## MINIWORLD

- Lear Siegler Adds Two Business Systems . . . 93
- A Couple of Minis Score Race for Couples . . . 94
- 'Fully Automated Office' Opens in Washington . . . 95
- French Firm Absorbs Shock of Other Vendors . . . 96
- Centronics Releases Printers for Small Systems . . . 97
- Mini-Based Unit Fills Pharmacy's Prescription . . . 99
- Broker Puts Stock Into Mini-Based Network . . . 100
- Mini Designs Buildings, Calculates Their Cost . . . 101
- Datapoint Offers Lease for Model 1500 . . . 102

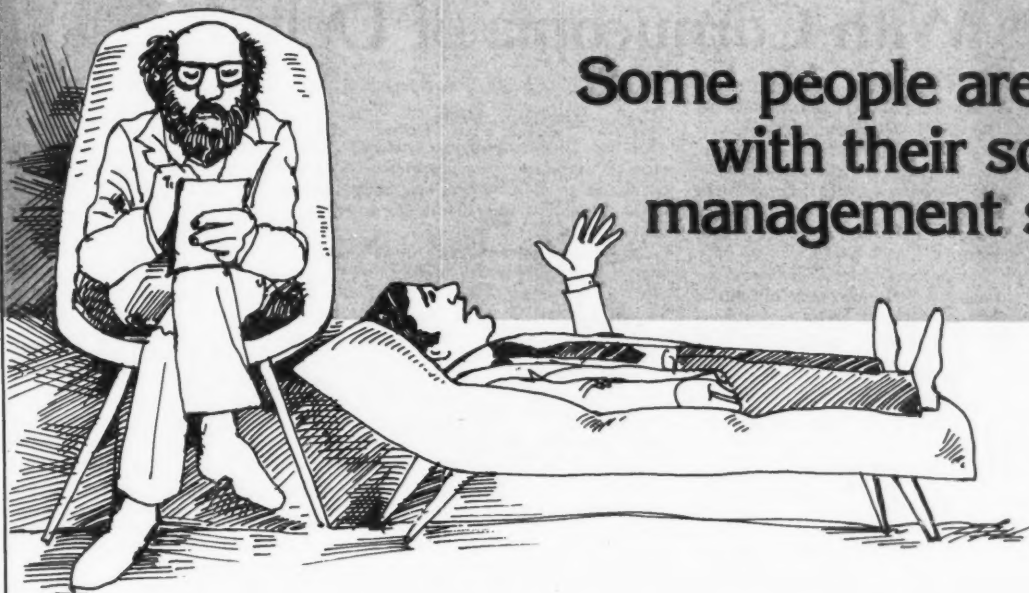
## MICROCOMPUTING

- West Coast Fares Differ Markedly . . . 107
- TI Adds TM990-Compatible Modules . . . 110
- Intel Micros Get Support From Microbench . . . 111

## COMPUTER INDUSTRY

- Vendors Wrestling With Cost of Support . . . 113
- Wang, DTS Alliance Extended to Cover VS . . . 113
- Eagleton Blasts Accountants for Offering DP . . . 115
- Employees Swell Ranks, Slow Growth at Prime . . . 117
- 'Business Is Business' at Compec Europe Show . . . 118





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# NCC Opens With Cornucopia of Debuts

(Continued from Page 1)  
the channel cable length.

An optional 2-byte-wide feature allows users to increase the transfer rate to 3M- to 4M byte/sec. Controller options allow the Fast-3805 to be attached to four channels to achieve a transfer rate of up to 16M byte/sec.

An Intel microprocessor is built into the system to manage the channel protocol. The unit emulates the interface between the 370 channel and the 2305/2835 or 3350/3830 disk system/controllers. At start-up, the micro automatically configures the system.

The built-in micro also checks the system for errors. It continuously cycles through the memory, reading the data and performing diagnostics to detect single- and 2-bit errors (double-bit errors).

If a number of errors is found in a given storage area, the system trans-

fers the contents of that area to spare storage and directs subsequent accesses to the new location.

Control logic is built into the system; the standard Fast-3805 contains one controller. Up to three more can be added, and an optional two-channel switch can be specified for each controller.

The system, which can be seen in the Intel booth here, sells for \$130,500 and rents for \$4,305/mo in a typical configuration of one controller and 12M bytes. This is 95% of the rental and 80% of the purchase price of the equivalent IBM disk unit.

A configuration of two controllers with 2-byte-wide features, two-channel switches and 48M bytes is priced at \$16,790/mo or \$507,920 to purchase. This is 76% and 69%, respectively, of the IBM 2835-1 and 2305-1 price for a similar configuration with

3M bytes less storage, Intel claimed.

## Mainframes Debut

The new Univac mainframe won't be officially announced until tomorrow, but the unit will be the firm's response to the recent IBM 4300 mainframe announcements.

The processor, a member of the 1100 line, will feature a new architecture that is based on multiple microprocessors linked together. In earlier experiments, Univac found such a system emulating the firm's 1108 processor could provide throughput advantages up to 40% over the standard 1108, while the cost of building such a processor would be one-third the cost of building an 1108. Full details on the system will be in next week's issue.

Harris Corp.'s new entry — the S800 — features a 48-bit pipeline architecture and cache memory. The unit is said to be 1.8 times faster than the firm's Series 500, which is in the same performance category as DEC's VAX-11/780.

The S800, which is the top of the firm's line, consists of two models, the S850 and the S870, and is compatible with other members of the Harris computer line.

The full word (48-bit) floating-point operations employ an 8-bit exponent and 39-bit mantissa, the firm said, noting double-precision operations can be used for greater precision.

The S850 can support up to 96 users and the S870 can handle up to 128 interactive users. The systems run Vulcan, Harris' virtual memory system; Fortran, APL, Basic, Cobol and RPG-II can all operate concurrently.

The processors can accommodate up to 3M bytes of main storage and a 6K-byte cache.

The basic S850 consists of a 960K-byte main memory, Series 800 CPU, 12M bytes of virtual storage, 80M-byte storage module drive with controller, tape, printer, communications processor, console CRTs and language processors and sells for \$285,000.

The basic S870 consists of 2M bytes of memory, 12M bytes of virtual memory, Series 800 CPU, 300M-byte storage module with controller, tape, printer, communications processor, operating system and language processors for \$370,000. Both will be available in the first quarter of 1980.

## Honeywell PPS

Honeywell's new Page Processing System (PPS) — the PPS II — contains its own Level 6 Model 43 minicomputer and can be attached to an IBM host computer in distributed environments, the firm said.

The printer, which works at speeds up to 18,000 line/min, in basically a field upgrade to the PPS I, but adds several features.

For example, it can produce color output, and the printing characters can be changed easily because of the embedded minicomputer.

The basic PPS II with 8,000 line/min printing, CRT, 64K-byte mini, a 96M-byte disk and the PPS optimized font costs \$135,000. The channel interface is an additional \$12,000 and an eight-pocket stacker will cost \$18,500.

The firm also announced a line of microprocessor-based terminals that are designed for distributed applications. The VIP7800 units have 12- or 15-in. screens, come in synchronous and asynchronous models and offer underlining, data validation, 72-line scrolling, separable and color-coded keyboards and a 25th line to indicate terminal status.

The basic unit costs \$3,060 and is available at \$100/mo. on a five-year lease.

## TI Terminals

TI is using NCC to add to its line of Omni 800 data terminals by introducing the Model 820 receive only (RO) printer offering 150 char./sec printing, the Model 825 keyboard send/receive (KSR) unit and the Model 825 RO unit, which prints 75 char./sec.

The Model 820 communicates at rates from 110- to 9,600 bit/sec and has a first-in/first-out (Fifo) buffer capable of storing 1,280 characters. It also features bidirectional printing with a 9 by 7 dot matrix and full Ascii character set.

The Model 825 KSR and the Model 825 RO also use bidirectional printing and a 9 by 7 dot matrix; each can be upgraded to print 150 char./sec as application needs expand. The two units operate at rates from 110- to 600 bit/sec and use a 256-character buffer for data overflow protection, the firm said.

The 820 RO printer is priced at \$1,995, the 825 KSR at \$1,695 and the 825 RO at \$1,565. Deliveries on all units will start in August.

## Dataproducts Daisy Wheels

Dataproducts came to NCC to unveil a line of daisy-wheel printers and terminals dubbed the D-50 family.

The line is made up of three units — a parallel interface printer, an RO printer and a KSR terminal. All members of the line print at 50 char./sec.

The units are said to accept daisy wheels from both Dataproducts and other manufacturers.

The parallel interface unit is priced at \$1,571, the KSR terminal is priced at \$2,366 and the RO terminal costs \$2,060.

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# Thanks to TI, Adds, Lear Siegler Small System Users See Lots of Action at NCC

By E. Drake Lundell Jr.

CW Staff

NEW YORK — While there is lots of new product action for large system users here at the National Computer Conference, minicomputer and small business systems users are also browsing among a wide range of new products.

Texas Instruments, Inc., Applied Digital Data Systems, Inc. (Adds) and Lear Siegler, Inc. all introduced products as the show opened today for a four-day visit to the Coliseum; many more product debuts are expected during the week.

The early announcements include the TI DS990 models 20 and 30, which use a new central processor, the 990/12. The CPU offers a threefold speed increase over the previous TI processors, according to W. Joe Watson, assistant vice-president. A cache controller with 2K bytes of 350 nsec memory gives the system a cycle time of 380 nsec for cache hits; the main memory cycle time is 740 nsec.

The Model 20 features the CPU with a 17-slot system and 70-in. rack cabinet. A minimum configuration includes 256K bytes of main memory, the 2K-byte cache, two Model 911 CRTs, a DS50 disk with 50M bytes of storage and a choice of either more disk or tape.

The unit can be expanded to include more than 20 terminals and up to four DS50 disks, the firm said. The price for the basic configuration is \$64,500 and deliveries will start in the fourth quarter.

The Model 30 uses the same processor. A minimum configuration comes with 256K bytes of memory, the 24K-byte cache, two CRTs and a DS200 disk with a 200M-byte capacity as well as a choice between tape or more disk. It can be expanded to handle up to 20 terminals and up to four 200M-byte disk drives.

The basic unit, priced at \$77,400, will also be delivered in the fourth quarter.

Both units are software-compatible with the firm's DS990 models 4, 6 and 8. All use the DX10 operating system.

## Meetings Slated On Measurement

Two regional chapters of the Computer Measurement Group (CMG) have meetings planned this month that are open to everyone interested in optimizing performance at their installations.

On Thursday and Friday of this week, June 7 and 8, the Southwest CMG will meet at the Hilton Palacio Del Rio in San Antonio, Texas. Additional information is available from Jim Hansen, VA Data Processing Center (31D), 1615 E. Woodward St., Austin, Texas 78772.

Next week, on June 13 and 14, the Southern CMG will meet at the Rode-way Inn, Woodlawn Road, Charlotte, N.C. Topics at that day-and-a-half conference will include hardware monitoring of IBM Series 30.

Al Cartledge, chairman of Southern CMG, can be contacted for more information at Celanese Corp., Box 1414, Charlotte, N.C. 28232.

High-level languages include Basic, Cobol, Fortran, Pascal, RPG-II, Tiform for CRT management and a data base management system, the firm said.

### Adds Adds

Adds, which has been primarily in the CRT and terminal business and primarily an OEM supplier, started on a different tack at NCC with the introduction of Vantage, a small business system that will be sold directly to small businesses through a network of distributors.

The unit features 52K bytes of main memory and uses double-sided floppy diskettes for additional storage. Up to 1.5M bytes can be stored on a three-

drive system.

The system comes with a CRT and a printer that is capable of 132 char./line. Software packages designed for small businesses can be purchased with the system.

The basic unit will cost \$15,500; applications packages for such things as general ledger, accounts payable, accounts receivable, inventory control and payroll are available at about \$1,000 each.

### Lear Siegler Emulates

Lear Siegler's Data Products Division is using its booth here as the launching pad for a 16-bit mini that is compatible with Data General Corp. Novas.

The Model 415 processor has a 200 nsec microinstruction cycle time, 32K or 64K bytes of memory with a 600 nsec cycle time and a direct memory access (DMA) channel.

The Nova-compatible instruction set provides memory access, arithmetic, logical and I/O functions.

Other CPU features are four hardware accumulators, two of which are usable as index registers, 16 memory locations, also serving as index registers, and 16 levels of priority interrupt.

Control and address lines to handle up to 62 device addresses in both programmed and DMA I/O modes are also provided. The unit costs "under \$5,000," according to a spokesman.

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# Slow But Steady, Univac Claims the No. 2 Spot

(Continued from Page 1)

tion of the No. 2 spot seems at this time to be moot. Whatever its position, however, Univac's computer business is flourishing. Its annual revenue growth averaged 14% during the past five years, with fiscal 1978 revenues topping \$1.7 billion, contributing 49% to Sperry Rand's total revenues and 50% to its earnings.

For its most recent fiscal year ended March 31, Univac's computer revenues passed the \$2 billion mark, a 19% increase from last year's results. The gradual improvement in Univac's contribution to Sperry Rand's overall pre-tax profitability makes the corporation a "computer company plus," Richard L. Gehring, Univac's president, said.

However, when Sperry Rand's profitability as a whole is compared with Univac's four other mainframe competitors, the company ranks next to last on return on shareholder equity, the ratio of net income to revenue and growth in earnings per share.

Sperry Rand has two other major divisions: Vickers, which makes fluid power equipment, and New Holland, which manufactures farm equipment. Together, these divisions contribute about 31% of Sperry Rand's revenues.

Both capital equipment makers, these divisions are sensitive to downturns in the economy. Computer industry analysts are concerned with the possible negative impact a down cycle could have not only on the parent corporation's profitability, but also on its capability to provide capital investment necessary to keep Univac's products on a par with the offerings of its competitors.

## Holdout No Longer

However, some of these perceived lags in product offerings are intentional, according to Univac. For instance, it is the only mainframer that has not responded to IBM's February announcement of its 4300 mainframe line.

For the time being, Univac executives are enjoying that bit of notoriety. But tomorrow, at the National Computer Conference, this last of the holdouts will offer its own new product line, codenamed Vanguard and said to be four years in the making.

"Our long-term product plans and strategies assume activities on IBM's part, but we are not on an IBM string," H. Glen Haney, vice-president of worldwide marketing, said. "We've learned to live next to the mountain."

Proceeding with plans at the company's rather than the market's pace seems to be the style at Univac. While that style may garner some criticism from industry watchers, Univac's position in the market today is solid.

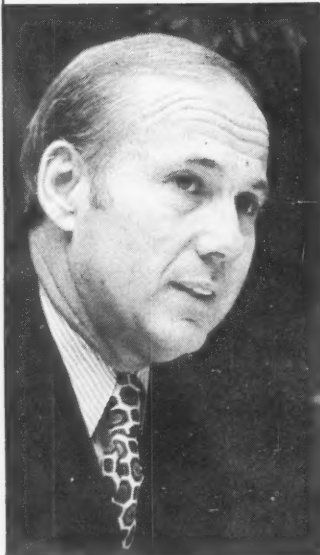
The installed base of Univac's general-purpose computers is worth \$6.5 billion, split 50-50 between domestic and foreign installations. Univac estimates its installed base of all types of equipment at about \$10 billion.

Univac ranks third in market share for general-purpose systems with 7.4% of the market, according to International Data Corp.

## Strong R&D Effort

To maintain its position, Univac is pouring funds into research and development at an unprecedented rate, spending 8% of its revenues on R&D

## SPERRY UNIVAC



H. Galen Haney



Richard L. Gehring

last year.

In fact, in fiscal 1978 Univac got \$153 million of Sperry Rand's total R&D budget of \$195 million, according to a recent annual report.

Although investment in software represents more than 50% of the R&D expenditure, Univac is investing heavily in research on large-scale integration (LSI) in order to cut product costs.

"We have the internal design capability for LSI and considerable capital to achieve it, but we have a shortage of design talent and quick product turnaround," Gehring noted.

Univac, once a heavy investor in bubble memory, recently abandoned that area because it became evident it would be cheaper to buy bubble memory when it was needed for products.

A recent shuffle in Univac's R&D organization and the departure of Dr. Barry Borgerson, the chief of research, caused rumblings among industry watchers. However, that reorganization pulled together four separate research groups the company considered to be acting too independently, one Univac official said. About 40 individuals were reassigned.

With about 100 researchers in total, 60% of whom hold Ph.D.s, those four groups do "pure research" and are not directly involved with Univac's ongoing commercial R&D, which involves about 3,000 people.

## Strength in 1100

As far as its present line of products is concerned, Univac's strength lies in its 1100 series of processors that are geared to the high end of the market, comparable to the IBM 370/148 and above.

Better than 50% of Univac's mainframe business is in the 1100 product line, Haney said. About 90% of the 1100/81, 82, 83 and 84 business is from old customers, so upgrading Univac's present customer base is a major strategic thrust of the company.

However, the power range of those processors, spanning the IBM 370/158 to Series 30, in most cases limits up-

grades to present users.

The degree of new business generated by the lower powered 1100/10 model was "much higher," Haney added.

In its other mainframe line, the 90 series, new customers accounted for 65% of orders for 90/25s, 30s and 40s. "March was the largest booking month for those products, and they are five years old," Haney noted.

## Lack of Uniformity Hit

However, some financial analysts contend that the 90 series has not been very profitable for Univac. A major criticism of Univac has been that it maintains two separate product lines requiring separate operating systems and application software. Univac's competitors offer products which allow migration from small-end to large-end systems.

At one time Univac considered merging the two systems into a series that could run either the 1100's or the 90's programs. The company abandoned that plan because of the risk that major conversion presented to its users.

Yet, at that time, Univac said it was still working toward a uniform product line slated for some time after the early 1980s [CW, Dec. 19, 1977].

In the past six years, Univac has simplified its product line somewhat, merging nine hardware systems into two product families and paring down its 14 operating systems to three.

## Users Want Unbundling

Despite these criticisms, Univac's users appear to be generally pleased with the company's products, particularly the 1100 series. "Univac has a policy of keeping its operating system in as stable an environment as possible," according to Ray Pardo, president of Use, Inc., Univac's large system users group.

However, users would like to see Univac unbundle its software, even though they fear the unbundled systems will cost more. Users think Univac will have to be more responsive to

criticism of operating system problems once it unbundles. Univac does not invest enough resources in fixing operating software problems, Manly Draper, a past president of Use, said.

Moreover, "with bundled software, Univac doesn't have the advantage of having extensive applications offerings," Pardo said. "Univac would have been much further down the road [with applications] if it unbundled eight years ago."

The Vanguard series will feature unbundled software, and Univac expects to do more unbundling in the future.

## Squeaky Wheel

Another major squeaky wheel in the Univac product line-up, according to Pardo, is a dearth of distributed data processing (DDP) products. Univac introduced its Distributed Communications Architecture (DCA) in 1976, but users do not think the company has introduced products to back it up.

"When we announced DCA, it was a concept of guidelines by which we were going to build future systems. It was a specification," Haney countered. Univac is now making a major push to get its distributed and transaction processing products to market as soon as possible.

## BC/7 a 'Disaster'

Although analysts generally agree that Univac's 1100 series is solid both from market and technological perspectives, they also agree that Univac has been damaged by its late entry into the minicomputer arena and that its BC/7 small business system is a "disaster."

Without conceding that Univac was a latecomer to the low-end processor sector, Haney did admit that most of the competitive pressure is coming from mini vendors, particularly in DDP applications. "Sometimes we don't even know that 10 or 15 (of a competitor's) minis have been sold into one of our mainframe installations," he complained.

It is this pressure from the mini makers, rather than other mainframers or IBM, that concerns Univac most. "We don't lose customers," Haney said, referring to the firm's mainframe users.

With the acquisition of Varian Data Machines from Varian Associates in 1977, Univac purchased 3,000 minicomputer customers. Although Varian has been labeled a "Mom and Pop" operation, Univac has been whipping its Minicomputer Operation (MCO) into shape.

In the last three months, Univac incorporated the MCO into the mainframe marketing organization in both the U.S. and Europe, Haney noted, stressing this reorganization was a vital strategic move.

MCO's sales force and its shipment rate have doubled and its floor space has tripled, he reported confidently.

The V77 product line, introduced last year, is an upgrade of the former Varian product line and was designed to be used in a DDP environment. Between 60% and 70% of Univac's mini business is from first-time users that Univac is hoping to bring into its mainframe fold.

As far as the BC/7 is concerned, Univac has appointed a new chief of that

(Continued on Page 7)



## With IBM, Hold 97.5% of Market Only Five of Seven Industry 'Dwarfs' Left

By Marcia Blumenthal  
CW Staff

Once upon a time Snow White and seven dwarfs competed in the general-purpose mainframe market.

Of those original seven, only five remain today: Burroughs Corp., Control Data Corp., Honeywell, Inc., NCR Corp. and Univac.

Together with IBM, these companies account for about 97.5% of the general-purpose computer market, according to International Data Corp. The market research firm estimates IBM's share at 71% of the installed base.

While IBM is overwhelmingly No. 1 in the market, the No. 2 spot is a matter of heated contention. Burroughs, Univac and Honeywell are currently slugging it out for the "We Try Harder" rating.

The annual computer revenues of

each of these five mainframes ranged in fiscal 1978 between \$1.7 billion and \$2.6 billion. IBM's computer revenues totaled more than \$17 billion in fiscal 1978.

Although most of the companies have endured severe financial setbacks during the past 10 years, they have all overcome their difficulties and charted new courses. Most have reported markedly increased revenues and profits in the past three years.

Each of the five companies has attempted to establish itself uniquely in the marketplace, either by targeting a specific industry like banking or the airlines or by offering equipment on which IBM does not concentrate, such

as scientific processors.

From an historical perspective, RCA Corp. and General Electric Co., the other two dwarfs making up the original seven, left the business when financial losses mounted. GE sold the computer systems portion of its business to Honeywell in 1970. At that time GE had 10,000 installations, with the original equipment valued at \$3.5 billion. Between 1965 and 1968, GE's computer business lost about \$152 million.

Honeywell acquired GE's business, giving GE a 9% equity interest in Honeywell and \$110 million in notes. Honeywell repurchased GE's holdings in the company last October.

RCA fizzled after 16 years in the computer business, selling the general-purpose mainframe portion of its business to Univac in early 1972. Univac paid RCA \$70 million for the 1 billion installed base. But the ultimate purchase price has been estimated as high as \$130 million because Univac agreed to pay RCA additional compensation depending on future revenues from RCA customers.

Although the mainframe shakeout scenario was played out earlier in this decade, most of the remaining five independents wrestled with financial problems that, in some cases, were not brought under control until a couple of years ago.

## Univac Claims The No. 2 Spot

(Continued from Page 6)

operation and extended the product line from one to three models. But the BC/7 and MCO lines have separate marketing organizations.

When asked the reason for this, Haney said that's the way the company has sold the product historically.

Univac is targeting the BC/7 heavily to the OEM market and third-party software houses.

### Industry-Specific Software

Of great significance to Univac's strategy is its industry-specific market segmentation plan, which went into full swing during fiscal 1978. "The plan is the touchstone around which other [strategies] will evolve," Haney said.

With this plan, Univac tailors application software and hardware to the needs of specific industries. A successful case in point is the Univac Industrial System (Unis) which, according to the company, has influenced the sale of hundreds of 1100s and 90s mainframes to manufacturing firms at twice the industry booking average.

Burroughs and NCR Corp. are also heavily targeting the manufacturing industry, so competition will be keen. But manufacturing firms are the largest industry segment and may well offer niches for all competitors.

Univac is also hot on the trail of the airline industry and last year increased bookings to this sector by 180% from 1977 levels. Haney estimated that Univac holds a 24% share of the airline market.

In addition, Univac is actively pursuing the energy market, of which it claims to hold a 17% share; the state, local and federal sector, of which it estimates a mid-20% share; and the health care, education and financial markets.

As far as the office of the future is concerned, Univac is interested and is "testing some products," but it has not yet been able to define the market. In its usual way, Univac will take its time deciding on which direction it will take.

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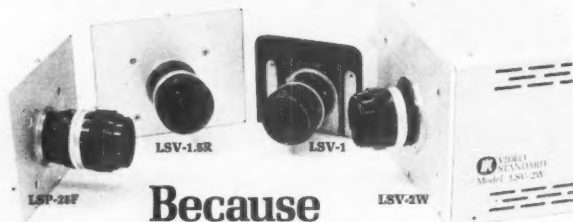
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## DPers at United Airlines Back in the Friendly Skies

By Jay Woodruff  
CW Staff

DENVER — United Airlines made good on its pledge to regain the lion's share of domestic airline traffic last week when its 57-day strike ended.

The airline's vice-president of computer and commercial services had indicated that United intended to be a "tough competitor when we come out of this," [CW, April 23], and it did just that by offering cut-rate fares and special discounts as high as 50% on coast-to-coast flights. United's DPers returned to work last Monday.

Between 27% and 30% of normal flights were in the air by last Monday, four days after 18,000 striking members of the International Association of Machinists and Aerospace workers ratified a three-year contract.

United's reservations personnel, who had been hired for the duration of the strike by American Airlines and Trans World Airlines, the carriers that absorbed the brunt of United's passenger load [CW, May 21], were called back the day after the ratification to prepare for the first flights on Monday, according to Jack Porter, United's vice-

president of administration.

The low fares seemed to encourage traffic. By United's second day back in the air, service was 50% of normal.

Nonmanagement DPers reported to work on the first day of the flights to take over functions that had been dormant through the strike — flight and food scheduling and other services related to the flight system.

However, the company's DP centers in San Francisco, Denver and Chicago were busy throughout the strike as they continued to provide flight maintenance services for other airlines, reservations services for Western International Hotels and program development to prepare for resumption of flights.

San Francisco returned from two shifts to the normal schedule of three shifts, while Chicago, which had handled payroll and refunds, assumed its regular schedule, Porter said.

The primary United computer center, which is in Denver, was least affected by the strike, continuing to supply reservations services to 1,000 travel agents across the country.

## Flight 191 Being Simulated

(Continued from Page 1)

Douglas Corp. — builders of the wide-bodied jet — and flight condition data already programmed into the simulators, American hopes to use the computers, believed to be from Honeywell, Inc., to learn why the jet fell from the sky after losing one of its engines.

### Time to Think

Although "flame-outs," or loss of engine power, are uncommon, under the right conditions a pilot theoretically should be able to compensate and bring the aircraft in for a safe landing.

"A pilot needs two things if he loses power in an engine: time to think, which may only be a couple of seconds, and maneuvering room," Raymond said. However, losing the entire engine from the airline's wing, particularly so soon after takeoff, "could very well be a whole different situation."

The pilot "doesn't have a whole lot of time to mess around with a complicated decision, and he has to pretty much go by instinct at that point," he added.

Even though the NTSB has put a tight rein on information available to the press until the investigation is completed, Raymond admitted that American's flight experts could take a number of avenues in their computer-guided tests. "They may program this thing to operate the way we think [the accident] happened, and they may include such things as loss of hydraulic power and loss of electric power." Then "they may do all these things differently to simulate every condition under which they think it might have happened."

Regardless of the direction the flight scientists choose, final results will not be released until every possibility is tested — which could take from several hours to several days, the airline spokesman said.

"There are so many different ways it

could have happened that they're going to have to simulate all of these different possibilities." Even then, "they can only come up with what probably happened if situation A was the case or if situation B was the case and so on."

While all this computer testing is going on, American Airlines' Tulsa, Okla., maintenance and engineering center will be examining the fallen engine, the landing gear and other pieces of the airliner for signs of abnormal stress or wear. But chances are slim that anything will be discovered while pouring over the mangled parts.

"Obviously, the accident itself destroyed the hydraulics and electrical systems, so there's no way of knowing whether that happened at the time of the accident or whether it happened when [the pilot] first lifted off and lost that engine," Raymond pointed out. And "the difference, of course, is a very important one."

Therefore, both American Airlines and the NTSB are putting faith in the flight simulators normally used by approximately 72 different airlines.

One point puzzling the aviation experts involves the cockpit voice recorder and the flight data recorder — the "little black boxes" that are important to the investigation of every airline mishap. The voice recorder keeps a record of all pilot-to-tower and cockpit communications, while the data recorder is a computer-like device that continuously analyzes 32 separate mechanical functions of the DC10.

Soon after takeoff, Flight 191's voice recorder stopped functioning, followed a few seconds later by the data recorder. Both, however, went out before the accident, Raymond stressed.

"As I understand it, the way the two black boxes are constructed and the way they're fed with electricity, it would seem they should continue to run until the moment of impact . . . or they should at least go out at the same time," he said.



# Complex Programming Style Blamed SSA Sends Garbled Bills to 30,000 Retirees

By Marguerite Zientara  
CW Staff

WASHINGTON, D.C. — A programming style that produced overly technical, unreadable computer-generated output has resulted in 30,000 older Americans receiving garbled payment due notices from the Social Security Administration (SSA).

Every year, SSA sends out notices to retired people asking them to estimate what they will earn in the next year. At the end of that year, SSA runs computer tapes comparing those Annual Earnings Reports with the actual earnings reported on W-2 forms.

"There are always those who underestimate what they'll earn, and then they must pay back benefits," according to an SSA spokeswoman. SSA takes the overpayments out of the next year's benefit checks incrementally, she explained.

Notifying Social Security recipients of their status with the SSA is the hard part of the program, according to Fred Schutzman, associate commissioner in the Office of Assessment.

"We have been faced with notice problems for a long period of time here," he said. The notoriously inaccurate computer-generated notices from department stores and banks are "simple" compared with SSA's problem, which Schutzman placed at "two or three orders of magnitude" of added complexity.

While the annual notices cause similar problems every year, he explained, 1979 brought an estimated 50% higher complaint rate from recipients. The substantially higher rate of error can be traced in part to a series of amendments to the Social Security Act made in 1977, which set up a "very complex" legislative program for the annual retirement task, he said. Because of those changes, SSA's computer program for calculating benefits and generating notices had to be overhauled.

## Accurate, But Unreadable

Currently, 325 phrases are stored in memory, each a potential sentence in someone's yearly SSA notice. SSA has not done a good job in specifying how these sentences should be put together in a notice, Schutzman said.

Therefore, even though SSA beneficiaries receive notices that are accurate concerning their financial status with the agency, the notices are complicated and nearly unreadable, he said.

For example, SSA often has to adjust a benefit upward for one reason and then downward for another. "So there is a whole series of complex computations we go through," Schutzman said. "The notices end up garbled because we're increasing this benefit, decreasing that benefit and coming out with a bottom-line number."

Furthermore, SSA was late in developing the legislative changes "for a number of reasons," he noted, including some computer-related problems. "We have an IBM 370/168 test machine that we use to run and validate our programs," he explained. "We had to increase the memory size from 1M to 8M bytes, and we had to use the General Services Administration (GSA) schedule."

"We got some very poor memory that

was unreliable, and the machine was down more often than it was up," he continued. SSA is currently procuring a new memory vendor, he said.

"Even though these people were working around the clock [to implement the changes], many times the machine was down," resulting in the delays, Schutzman explained.

## Creating Readable Notices

Since January, the SSA has been working on the problem of creating readable notices. At that time, the commissioner of the SSA set up a task force involving people from the Public Affairs Department "who know how to write English," Schutzman

said.

"While our notices can be understood by our technical folks, it's very hard for the ordinary public to understand them... We're considering putting out a more generalized notice that will give enough information to be understandable, and if anyone wants more details, they can come in to see us," he explained.

In addition, the task force plans to recommend a different kind of logic for generating notices. This approach would not cause a different paragraph to be generated with each individual computation, but would set up flags for certain conditions.

The group is recommending that be-

fore the notices go out, they are reviewed by the task force for readability.

To illustrate the complexity of the situation, Jan Prokop, associate commissioner for automated systems, offered an example. "An average notice letter might contain 10 of the 325 potential statements. If we were to take the 325 statements and find the number of sets of 10-statement letters that could come out of it, we would have a collection of three times 10<sup>10</sup> individual, specialized letters."

"It is impossible to test three times 10<sup>10</sup> individual letters, certainly within the time frame that we had to implement this system," he said.

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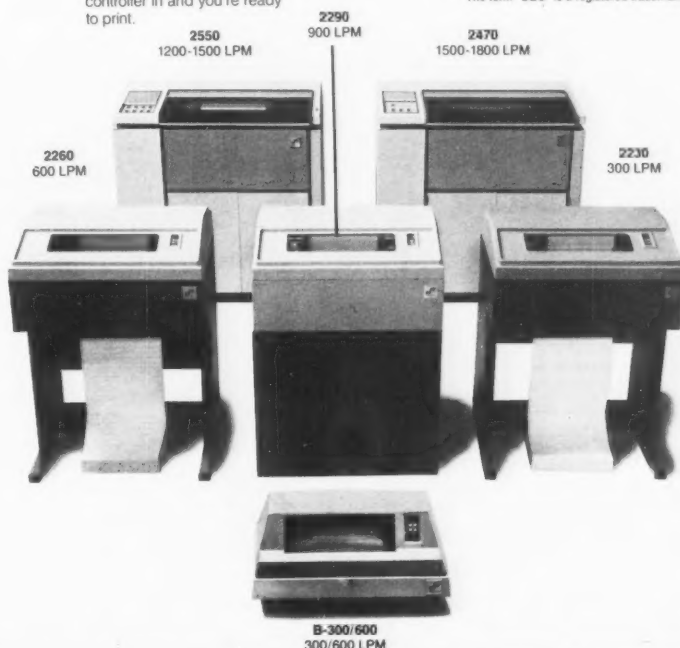
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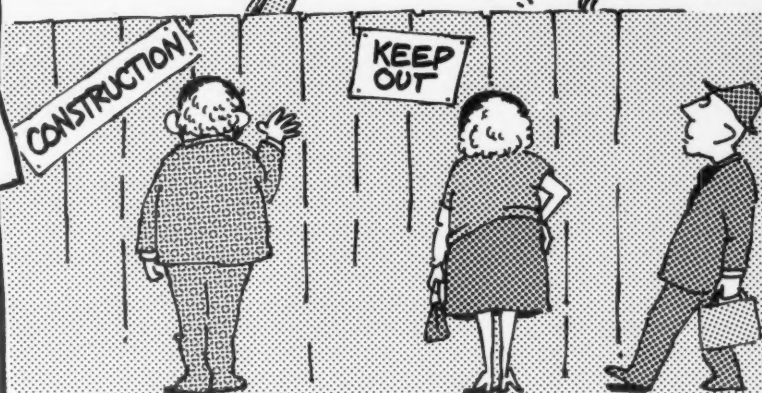
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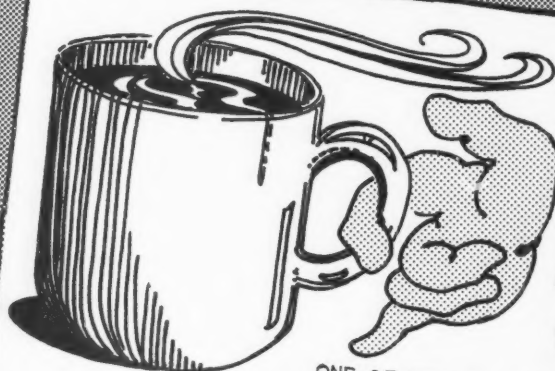
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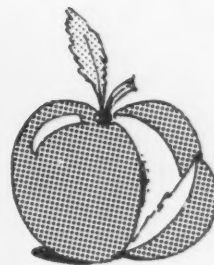
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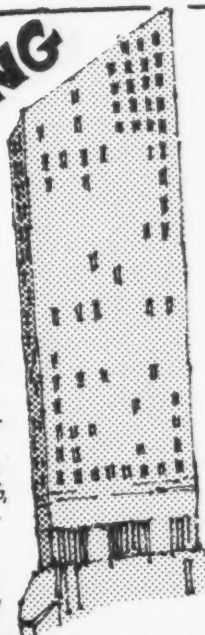
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"THE MARKET" IS NEW YORK CITY'S ANSWER TO THE SUBURBAN SHOPPING CENTER, AND THERE IS OFTEN FREE ENTERTAINMENT IN THE CENTRAL PATIO AREA.

# IBM 'Bugging' New Building to Manage Energy

By Connie Winkler

CW Staff  
NEW YORK — The address is 590 Madison Ave. and the 43-story edifice under construction is the new IBM building — but it is also a distributed data processing system in itself. The building will be bugged with 1,000 intelligent thermostats connected to three IBM Series/1 minicomputers, all of which will be controlled by another Series/1 to monitor energy consumption.

At a recent press conference here, the company outlined its own efforts at saving \$125

million in energy bills in the past five years through conservation; how customers use the Series/1 to save energy; and how IBM communicates the conservation message to employees.

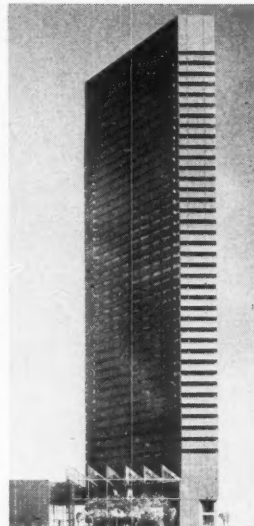
"There's no single solution to energy conservation," according to John Honeycomb, director of energy programs for IBM's Real Estate and Construction Division (RECD), which has worldwide responsibility for IBM's energy saving.

The midtown Manhattan skyscraper now under construction is IBM's most ambi-

tious building project to date and is the true marriage of computers and conservation solutions. An aluminum sensing device about the size of a bread box that will be hung in the ceiling of each room, Honeycomb explained. Supplied by Beckman Industries, the microprocessors will perform process control functions. They will also work in analog fashion with air processors that will move air in the building.

"We can change every thermostat in the building whenever we want," Honeycomb said about the advantages of the sensors in each room.

The ceiling microprocessors will communicate with three Series/1s, which will then communicate with the control Series/1 to regulate temperature and humidity, air conditioning and ventilation, as well as detect and pinpoint equipment malfunctions that could lead to energy waste.



An energy management system is part of the plans for the IBM building now under construction at 590 Madison Ave.

However, IBM is not leaving the country's future energy situation to chance. It is installing four-inch vents under each window to bring in fresh air if necessary.

## Simulation First

While the building was still a design concept, a computer model of it was subjected to a year's weather conditions on an hour-by-hour basis, simulating conditions for wind, temperature, humidity and barometric pressure. As a result, exterior glass was reduced to 35% of the total exterior surface.

Computer simulation was also used to assure that the glass-enclosed garden on the south side of the building would get enough sunlight. That garden will be warmed by the building's exhaust air.

Within IBM, computer simulation has been used to design several buildings for optimal energy use, including the General Systems Division (GSD) headquarters in Atlanta and an addition to the World Trade Corp.'s Americas/Far East building in Mt. Pleasant, N.Y. Always experimenting, in Mt. Pleasant IBM is trying exterior screens in front of the windows which can be raised and lowered depending on the sunshine.

## 'Time Has Come'

About 1,000 IBM customers have now installed either GSD's Series/1 or the System/7 to monitor and then regulate energy consumption. "Energy management is a computer application whose time has come," Jim Chapman, GSD manager of systems sales programs in Atlanta, said. Picking up a Department of Energy slogan, he added, "If it saves energy, it pays for itself."

Some of GSD's best Series/1 customers are supermarkets, which use 5% of the country's total energy and end up paying more for utilities than rent. The Shopwell supermarket chain in the New York metropolitan area has saved 25% of its utility bills and is one of IBM's showcase accounts. Shopwell has installed 51 Series/1s and plans 21 more.

Basically, the computer continually measures the amount of electricity consumed and compares that to targets the company sets in advance. The control devices then take action — for example, turning off an air conditioning fan when a room is below 68°F.

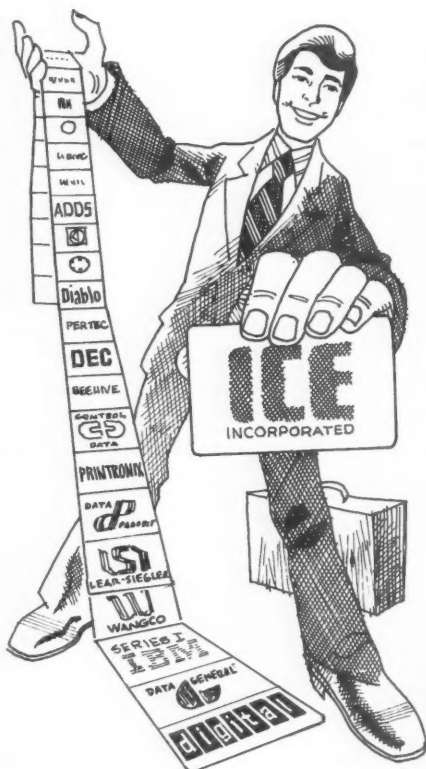
Internally, IBM has an energy usage data base which tracks energy usage at its 250 locations. The system is part of a worldwide network based on two IBM 370/165s and one 370/168.

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# Mini Plays Doctor for Air Traffic Controllers

By a CW Staff Writer  
BOSTON — A minicomputer served as the vehicle for a three-year study of air traffic controllers, from the initial establishment of testing procedures through the on-line collection and storage of data to the final testing and validation of hypotheses.

The study, directed by Dr. Robert M. Rose, then at the Boston University School of Medicine, was designed "to assess the relative variables that might predict future physical and psychological health change" for controllers, according to Larry Koolkin,

who worked on the study and is presently manager in the Department of Psychiatry at the University of Texas Medical School.

Before the 416 original volunteer subjects were recruited, a great deal of groundwork was laid to prevent the misuse of confidential information gathered during the course of the study. For example, the terms of the contract were written so the data on each individual subject was not the property of the federal government, but of the participants.

Furthermore, the commis-

sioners of health in the various states involved secured exemptions from the subpoena of information about individuals. In addition, commitments were secured from the federal government and the Federal Aviation Administration relinquishing the right to request information on any individual that was obtained during the course of the study.

The controllers studied came from two major air route traffic control centers — the Boston Center in Nashua, N.H., and the New York Center in Islip, N.Y. Others came from Boston's Logan International Airport Tower and the Common Instrument Flight Rules Room at Kennedy Airport, as well as smaller facilities.

## Questionnaires, Checkups

The data used to determine health change was gathered in several ways. Subjects filled out a medical history questionnaire reviewing personal and family health histories, health habits and symptomatic complaints. Most forms were administered interactively with CRTs; paper and pencil backup forms were available in case of hardware failure, Koolkin explained.

Each participant had five interviews and physical exams with the study physician. During each visit, chest X-rays and electrocardiograms were administered, blood chemistries were measured and urinalyses were performed.

Mild and moderate illnesses, such as flu or respiratory problems, were discovered through monthly health checklists, on which each person indicated illness episodes, continuing health problems or injuries that occurred during the last month.

## Twofold Testing

Psychiatric health change was assessed in two ways: first, by the widely accepted structured psychiatric interview, the Psychiatric Status Schedule, and second, by a monthly checklist designed to detect "troubling episodes of depression or anxiety," according to the study report.

The other major category of predictors assessed were responses to air traffic controlling itself, measured while controllers were at work.

For the course of the entire study, a Digital Equipment Corp. PDP-11/45 minicomputer with 64K words of main memory, one 88M-byte disk drive and one 9-track tape drive monitored all the data.

Data was organized in the computer by primary data type, he said. Distinct project numbers were associated with each data type, and each project was subdivided into a standard set of subproject ac-

counts including development, master data storage, statistical analysis and production.

Each subject was assigned a unique set of data keys. One, called the "open ID," referenced nonconfidential material. The open ID mostly helped with administrative recordkeeping and reporting and scheduling algorithms that required distinguishing subjects by name.

The other keys, in interaction with a set of keys committed to memory by the project director and deputy project director, allowed them to encipher all confidential data.

## Statistical Data Bank

Researchers used Version 2 of Cosap, enhanced in-house, for statistical analysis. The modifications allowed for the

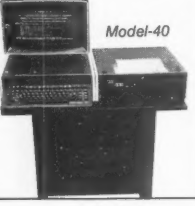
creation of a data bank from nearly any preexisting file type and permitted interactive analysis from elementary statistics through 50 variable correlations.

The PDP-11 version of the BMDP statistical package was used for complex batch-oriented statistical analyses, Koolkin said. Since the PDP-11/45 was dedicated to this single research study, it afforded tight control and data security, as well as unlimited computer time to perform long, complex statistical analyses in-house, he pointed out.

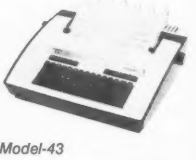
Administrative tasks were performed on-line including scheduling subjects, monitoring attrition and maintaining files of relevant identification data for each subject from all prior visits.

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## Stress Studied as Culprit In Air Controller Illness

By Marguerite Zientara

CW Staff

BOSTON — Air traffic controllers who perceive their work environment negatively and who are dissatisfied with their work, with co-workers or with the Federal Aviation Administration (FAA) are more likely to develop either psychological disorders or mild physical illnesses, according to a computer-assisted medical study. (See related story on facing page.)

The three-year study of more than 400 controllers, conducted under the direction of Dr. Robert M. Rose at the Boston University School of Medicine, was undertaken in an effort to document the amount of stress inherent in air traffic control as well as the impact stress might have on the physical and psychological health of the controllers.

The physical ailment found to be more prevalent among controllers than among other occupational groups was hypertension, and the most prevalent psychiatric difficulty involved impulse control disturbances, "reflecting the relatively high number of men who manifested an inability to control overt anger, antisocial impulses or illicit drug use."

In addition, the study found that those men who developed more physical or psychological problems spent as much time working as their peers and were described as competent by them.

They did, however, feel estranged or alienated from their work, they indicated, despite the fact that they said they enjoyed air traffic control work. They were usually more interested in doing a good job than those who did not develop disorders, even though they could not discharge their tensions well after work and often turned to alcohol, the study found.

"These findings suggest it was not so much what they were doing but the context in which they were doing it and the attitudes and feelings they had about their situation that influenced their risk for health change," the report stated.

### Gripes With FAA

Dissatisfaction with FAA management policies is a "significant problem," according to the study, and is believed to "represent part of the negative set associated with an increased risk for health change."

While many air traffic controllers are at odds with the FAA on a number of important issues, one that has received attention in recent months is the lack of computer backup systems in a number of the largest and busiest airports in the country [CW, March 20, Nov. 6, 1978; March 26, April 23, 1979].

Air traffic controllers claim that losses of computer-generated alphanumeric data superimposed on their radar screens often cause controllers to become disoriented and momentarily increase the chance of a mid-air collision.

With computer backup systems, the alphanumeric data would not be lost at all and the controller would not have to readjust his thinking in a potentially dangerous situation, they claim.

The study also found that some Professional Air Traffic Controllers Organization (Patco) union activities may inadvertently have contributed to the

"alienation and divisiveness many controllers experience in the ongoing adversarial relations with the agency."

It should be noted that while controllers appear to suffer from hypertension more than other types of workers, "it is inappropriate to conclude that hypertension is caused by air traffic control work *per se*," the report said.

In addition, the study concluded that hypertension itself does not hamper a person's abilities to control traffic.

In the area of psychiatric problems, slightly more than one-half of the men studied experienced one or more "significant psychiatric problems" during the three years of the study, an occurrence unanticipated by the researchers.

## 'Just Part of the Job'

By a CW Staff Writer

INDIANAPOLIS — When a bolt of lightning struck the nose of a passenger jet on its approach to Indianapolis International Airport last March, the BAC-111's nose cone and its weather radar sweep antenna disintegrated.

As a result, the pilot of Allegheny Airlines Flight 474 was equipped with only sporadic air speed readings: while the captain's gauge read 160 knots, the first officer's instruments showed 190 knots.

Because of the importance of correct air speed indications in an aircraft, especially when approaching an airport, the crew immediately notified the Indianapolis airport traffic control tower of an emer-

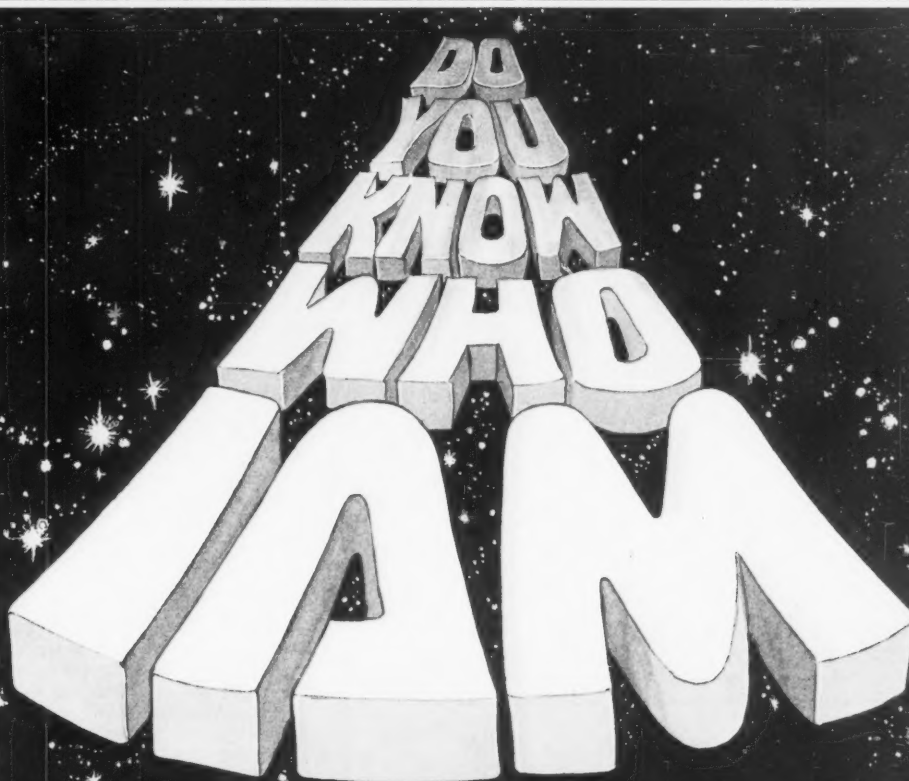
gency situation.

Lawrence E. Patrick, a nine-year veteran controller, was working the approach control position in the tower's radar room and received the "emergency" transmission. Using Indianapolis' Arts III radar system, Patrick could determine the airplane's actual air speed of 250 knots, a speed much faster than the plane's crew realized.

Arts III is the most sophisticated radar system presently available for terminal air traffic control and is in use at most busy medium- and large-size airports in the U.S.

The system consists of a radar-scope indicating airplanes' positions by means of blips and an IBM

(Continued on Page 16)



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## Law Enforcers to Learn Techniques of DP Crime

By John Whitmarsh  
CW Staff

MIAMI — Want to learn how the Mob launders money? Care to bone up on drug dealing or fencing of stolen goods? Hanker to learn the fine points of illegal electronic funds transfer?

The Dade County (Fla.) Institute on Organized Crime teaches these and other subjects, but the students are not budding criminals. They are police officers, investigators, prosecutors and auditors who have come to learn preventive law enforcement.

Among the institute's new course offerings this year will be a two-week session on computer investigation techniques and computer crime, scheduled for Dec. 3-14. Because the course is new, attendance will be limited to 25 persons, all from state and local law enforcement and regulatory agencies.

Law enforcement officials are not the only students at the institute, though. Business executives, security professionals, legislators and investigative reporters have also attended, coming here to participate in one of 13 program areas from evidence gathering to rackets, narcotics and gambling investigation.

### Under LEAA Grant

The institute, financed by a grant from the Law Enforcement Assistance Administration (LEAA), has been teaching such courses on the campus of Biscayne College here since 1970.

The institute is one of three LEAA-financed centers that concentrate on techniques to combat organized crime. The other centers are the Western Regional Organized Crime Training Institute in Sacramento, Calif., and the Cornell Institute on Organized Crime in Ithaca, N.Y.

The announcement of the computer techniques course is one reflection of the mounting interest in white collar crime by federal and state law enforcement agencies. The Federal Bureau of Investigation runs three- and four-week computer courses and, until recently, had invited local officials to participate. Now, with its classes bulging, the FBI courses are reserved for federal officials only, and the institute here was designed to fill the gap.

The computer course is divided into two parts, according to Bruce H. Jones, computer program coordinator.

Half the course will be devoted to using the computer as an investigative aid. Students will learn how computers can be used to assist in major fraud investigations and in organized crime/white collar crime cases, where large numbers of documents are collated to develop patterns and indicators of criminal activity, Jones said.

The other half of the course will explore computer crime, using case histories of how computers have been used to commit a crime, Jones added.

### DP Background Not Needed

The course is intensive and accelerated but geared to students who have no knowledge of DP. Instructors have been chosen accordingly. Among them are Gus Bequai, former prosecutor for the Securities and Exchange Commission and author of a book entitled *Computer Crime*; Milton Weinberg,

computer consultant with Systems Sciences, Inc. of Sacramento, Calif.; and David Rosenstein, EDP auditor with Southeast Bank in Miami.

Students will travel to an IBM manufacturing/R&D facility in Boca Raton for an introduction to computers. The visit will include hands-on exercises, an explanation of programming and an overview of computer job functions. IBM will also assess the points of vulnerability in DP systems.

Cost for the two-week course is \$300 plus travel, room and board, Jones said, adding that he feels the small investment has a potentially huge return.

"We asked LEAA for a grant to put on a course that would help local law enforcement officers avoid the trauma of getting into a computer crime investigation," Jones said.

"In some cases, detectives and intelligence officers talk to their informants who may describe technical subjects such as computers, and the officer will either disregard the information because he is not familiar with what the informant is talking about or he will not recognize the significance of what he is told."

Another goal of the course is to help police investigators and intelligence officers develop information from which to estimate more accurately the real scope of the problem.

"What concerns me most," Jones said, "is the number of people 'guesstimating' the amount of computer crime in the country."

Business or professional groups desiring information on courses or support services from the institute should write to Bruce H. Jones, assistant coordinator, Dade County Public Safety Department, Institute on Organized Crime, 16400 N.W. 32nd Ave., Miami, Fla. 33054.

## Tight Situation Part of His Job

(Continued from Page 15)

9020E system that superimposes alphanumeric data on the screen to tell controllers a plane's flight number, altitude and ground speed.

Patrick informed the Allegheny crew of its actual velocity and they slowed the jet to approach for landing. As the jet continued inbound, Patrick kept the crew advised by calling out the ground speed his radar provided, until the flight made an uneventful landing.

While Patrick noted that his assist was "just part of the job," he added, "You're more nervous after it's all over and done with, but you just don't think about it when it's happening. Your natural reflexes do the job."

One must "expect the unexpected" as a controller, Patrick said, noting that only once before had he controlled an airplane that had been hit by lightning.

That happened "eight or nine years ago" when he was in the service. However, at that time there wasn't any major damage.

Without the alphanumeric printout on the scope, "we would probably have found another airplane in the vicinity to get the [Allegheny flight] in its sight and talk him down," he said.



# FCC Reconsidering GTE/Telenet Merger Terms

By Jake Kirchner

CW Washington Bureau  
WASHINGTON, D.C. — The Federal Communications Commission (FCC) was slated to hold a public meeting last Thursday to reconsider the conditions it set in approving the merger of General Telephone and Electronic Corp. (GTE) and Telenet Communications Corp.

GTE's chairman and chief executive officer, Theodore F. Brophy, requested the meeting in a May 3 letter to FCC Chairman Charles D. Ferris. The letter expressed GTE's "disappointment" with the conditions specified by the commission for the merger.

The FCC ruled May 2 that Telenet would have to be operated as a strictly separate subsidiary of GTE in order to guard against any violation of antitrust laws and to preclude any anticompetitive practices on the part of the new corporate entity [CW, May 14].

The merger, originally scheduled to be completed by May 21, has been rescheduled

for June 14. A GTE official said "GTE has made clear its unhappiness with the conditions" imposed by the FCC, but he declined to speculate on what action the company might take if those conditions are not relaxed. "It's anybody's guess," he added.

But FCC Commissioner Joseph R. Fogerty said recently, "I am convinced that the deal will fall through" unless "those 10 onerous conditions" are changed.

## Major EFT Study Gets Under Way

A major study of electronic funds transfer (EFT), requested by Congress, got under way recently with the first meeting of the Office of Technology Assessment's (OTA) ad hoc EFT advisory panel.

Chaired by Dr. Kent Colton of the Institute of Government Service at Brigham

## Washington Update

Young University's Graduate School of Management, the panel is advising the congressional technology office in this staff study, expected to be completed by December.

The EFT assessment is part of a larger national information systems assessment, which also includes studies of electronic message systems and of the Justice Department's National Crime Information Center.

The purpose of the EFT assessment, as described during the May 18 meeting here by OTA staff member Joseph Coates, is to provide Congress with a thorough description of the issues involved in the growing use of EFT. While not recommending specific congressional action, the study will attempt to identify the areas of societal conflict accompanying EFT and describe the options available to Congress to resolve those conflicts, he said.

Zal Shavell, an OTA staff member who is heading the effort, told the advisory panel the assessment will concentrate of five "clusters" of issues and related questions:

- Cost effectiveness/cost benefits — has the implementation of EFT resulted or will it result in an increase in the cost of services provided to the consumer?

- Government activity — will EFT necessitate changes in the government's regulation of financial institutions?

- Reversibility — would manual banking systems be capable of handling large-scale failures of EFT systems? Has the point of no return in the use of electronic banking and payment systems been passed?

- Vulnerability — what dangers to consumers and financial institutions does EFT pose?

- Behavioral impacts — how will the basic economic structure of the U.S. be affected by EFT?

Shavell said the task of the advisory panel is to act as a sounding board for the OTA staff and to help identify where OTA should put its "limited resources" in the study. The panel will meet again in October.

## White House Gets Message Study

An interagency study of electronic message systems has been sent to the White House by the National Telecommunications and Information Agency and will be delivered to the President any day, Administration officials said last week.

In the meantime, the U.S. Postal Service, which has delayed any further action on its proposed domestic electronic mail experiment until the findings in the report are made public [CW, May 17], has replied to a Federal Communications Commission (FCC) warning not to attempt extending the Postal Service monopoly to cover electronic mail [CW, April 2].

The FCC action came after Graphnet Systems, Inc. asked

the commission to determine if it has regulatory jurisdiction over the Postal Service's proposed Electronic Computer-Originated Mail (Ecom) service, a joint venture of the Postal Service and Western Union Telegraph Co.

In a recent reply filing, the Post Office told the FCC the service is not restricted from offering electronic message services and that under the Communications Act of 1934, the post office cannot be defined as a common carrier — and thus subject to FCC regulation — because it is a federal agency.

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## Truckers Avoid Wasted Fuel With 'Calm' System

By a CW Staff Writer

WASHINGTON, D.C. — The trucking industry recently launched its second computer-aided attack in the war against spiraling fuel costs and dwindling supplies.

Last February, the American Trucking Association's (ATA) DP subsidiary, ATA Services, Inc., and the Common Carrier Conferences began using a centralized computer here that matches freight with the irregular route carriers — truckers having no specific delivery channels — traveling to the cargo's destination.

The Computer-Assisted Load Matching (Calm) system is an extension of ATA's computerized Interchange Substituted Service (Ciss), introduced more than a year ago to help limit the number of regular carrier backhauls — trucks returning empty [CW, Aug. 7].

Although the system is still in its infancy with only 12 trucking firms signed up as members, Calm supporters expect the program to re-

duce "empty mileage" by 25% and save more than 35 million gallons of diesel fuel annually, an ATA spokesman said.

Along with the Ciss program, Calm is based on a Digital Equipment Corp. Decsystem-1060 processor with 512K words of main memory, three RP06 disk drives with a total of 528M bytes of storage, four tape drives and a communications controller.

Carriers access the system via their own terminals through the Tymnet, Inc. remote computing network and can post any freight to be shipped as well as any backhauls or empty trucks, the spokesman explained.

The system basically works in much the same way as newspaper classifieds. Truckers and shippers notify each other over the telephone and work out destinations and shipping accommodations to the satisfaction of both parties. When an agreement has been reached, the load is removed from the computer's file.

## R.I. Joins List of States Adopting DP Crime Bills

PROVIDENCE, R.I. — Rhode Island has joined the growing roster of states with computer crime laws.

H.B. 217 was signed into law May 5 by Gov. J. Joseph Garrahy and took effect immediately. The bill passed the state House of Representatives on April 4 and the state Senate on May 4. Florida and Arizona passed computer crime laws last year, and similar legislation awaits Colorado Gov. Richard D. Lamm's signature.

The Rhode Island bill was introduced by the state attorney general at the request of legal counsel for the University of Rhode Island (URI). "The attorney general indicated that in his opinion the present statutes of Rhode Island were not adequate to deal with the problem of computer theft or abuse," according to URI counsel Joseph DeAngelis.

Asked about the extent of computer crime in the state, DeAngelis replied, "I don't know if there has been any prosecution in Rhode Island for computer theft, but this law is intended to deter anybody contemplating such a crime."

### Two Differences

The Rhode Island bill was modeled after pending legislation in California, S.B. 66, according to J. Michael Shaughnessy, who is the assistant to the director at URI's Academic Computer Center.

While the Rhode Island law follows the same format and contains the same wording as that of other states, it differs in two points from the upcoming Colorado law. It does not define "financial instruments" nor does it include "microwave communications" in the definition of "computer networks" — two inclusions Colorado attorneys and Denver computer experts believed were important.

A person contemplating a computer crime, however, would do well to con-

sider committing it in Rhode Island instead of Colorado.

Violation in Rhode Island is a felony punishable by a fine of up to \$5,000, up to five years in jail or both. Violation in Colorado constitutes a felony or a misdemeanor, depending upon the value of the item taken, and penalties presently include fines up to \$30,000 and jail sentences up to 40 years.

At least 15 pieces of computer legislation are pending in 11 other states.

## Micro Pioneer Gets Degree

NEWARK, N.J. — Jerome Drexler, a pioneer in the field of microelectronic technology, has received an honorary doctor of science degree from New Jersey Institute of Technology in recognition of his contributions to science, education and business.

The degree was conferred on Drexler during the institute's 63rd commencement ceremony on May 25. Drexler, who is president of Drexler Technology Corp in Palo Alto, Calif., is a native of Newark and earned an M.S. degree from the institute (then Newark College of Engineering) in 1955.

As a member of the technical staff at Bell Labs, Drexler co-invented the coaxial magnetron, a means of transmitting microwave impulses for radar applications.

Drexler founded SFD Laboratories in New Jersey in 1959 and served as its executive vice-president and general manager until 1965. After graduating from Stanford, he formed Drexler Technology Corp. in 1968.

Especially significant among his contributions in microelectronics was his design and development of the Drexon laser recording disk, an optical memory for data storage and retrieval.



# While Picture in U.S. Seesaws AAA Prefers to Chart Gasoline Level Manually

By Tim Scannell

CW Staff

FALLS CHURCH, Va. — As nationwide gasoline prices soar and fuel availability declines, at least one agency here has discovered that it's easier to use manual methods than computers to keep track of the ever-changing energy picture.

"The situation's changing so damn fast that if we wait just a week, our [gasoline] report may be inaccurate," according to Tom Davidson, managing director of information services for the American Automobile Association (AAA).

Headquartered in this Washington, D.C., suburb, its branches scattered across the country, the AAA is considered to be the only comprehensive authority on seesawing gasoline levels in the nation. In fact, the association's weekly fuel reports are used extensively by nearly every U.S. newspaper, government agency and even some sectors of the oil industry.

However, rather than use its multimillion dollar computer system here to keep abreast of the gas situation, the AAA relies on a mostly manual system to pinpoint nationwide fuel flows. Each week, about 199 of the agency's individual clubs poll more than 5,000 service stations located in the U.S. and Canada and compute gas levels and statistics with pocket calculators.

The individual branches then telephone their findings to the AAA's headquarters, where the data is distributed upon demand to the general public and the association's approximately 21 million members.

"The turnaround time is something like a day from the time the [gas] information comes in to the time it comes out," Davidson observed. The AAA's computer system currently isn't geared to handle the flood of constantly changing fuel figures.

## For Holidays in Past

Until a few weeks ago, the association's computer complex helped produce an infrequent gasoline availability report that was released prior to each major holiday period. The reports initiated during the 1974 Arab oil embargo to find out if consumers were limiting purchases, were produced about six times a year for the press "and other interested parties," Davidson noted.

In fact, the reports were briefly issued on a weekly basis in the summer of 1974, when the embargo and the resulting fuel crunch were at a height.

Back then, the reports focused on "what the situation was vs. what the projection would be," Davidson said.

The various AAA branches would mail data to the Falls Church center at the beginning of a week before a holiday, and the computer would prepare a report by that Friday.

Gas levels aren't as stable as they were then, the AAA official said. Currently, gas stations have fuel today, "but they don't have it tomorrow."

## Accuracy Check

The AAA computer is presently used to check figures after they have been released to the public and to build an ongoing file of past consumption levels and availability. "Even though we have already reported the figures publicly... we will be putting them

on the computer to make sure that there are no gaps in the accuracy," J.K. Aldous, AAA's vice-president of public and government policy, stated.

"It's almost impossible," however, to say "whether we could speed it up to handle our needs on a weekly basis."

Housed in a pagoda-like building here, the AAA's computers provide membership processing, emergency road service and general accounting, payroll and insurance processing facilities for 39 of its clubs and divisions. Hardware consists of a Honeywell, Inc. 2070 mainframe with 256K bytes of memory; a Univac 1100/80 with 524K words, two Honeywell, Inc. Level/6 Model 43 machines with a

combined memory of 256K bytes and a 128K-byte Datapoint Corp. 6600.

Although the equipment doesn't operate in a linked real-time mode, all of the machines interact with one another in an off-line communications fashion. The center has a total disk storage capacity of about 2.2G words.

While the Department of Energy sanctions the AAA's gas-tracking procedures and weekly fuel roundups, the association's reports are not the "official" energy word of the U.S. government. The Bureau of Labor Statistics periodically issues "apparent demand figures" that are based on the gas sales tax receipts collected from each state as well as oil company delivery figures.

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# DP Center Escapes Ruin by Fire, Then Water

By Ann Dooley

CW Staff

HARRISBURG, Pa. — Commonwealth National Bank's computer center here narrowly missed destruction by both fire and the water used to extinguish it because quick-thinking employees and firemen followed security procedures laid down for just such an emergency.

The fire began in the ceiling of the bank's second floor at

4:33 a.m. on May 9. It caused a section of the roof to collapse and several steel joints to buckle from heat before it was brought under control.

The computer room, located on the first floor, sustained significant water damage; as much as six inches of water accumulated under the floor where the electrical wiring was housed.

Although the electrical wiring had to be removed,

checked and some taken off-site to be dried, it was all found to be operable, bank officials said. The computer equipment itself was not damaged.

Although arson has been ruled out, fire authorities have not yet determined how the fire began. The extent of the damage is still unknown.

Fire fighters knew exactly what to do because the bank has worked closely with each

area fire company as part of its routine security measures, a spokesman noted. Commonwealth National regularly asks the fire companies to tour its facilities so that fire fighters are aware of the bank's critical areas.

As a result of this procedure, some of the firemen fought the blaze while others covered the vulnerable computers with tarpaulin. No damage occurred as the water cascaded

from the second floor to the main floor.

The computer equipment at Commonwealth includes a triplex Burroughs Corp. B4700 system with a shared disk. The system has four line printers, three magnetic ink character recognition sorter readers, eight tape drives, an audio response unit, 15 on-line CRTs and two tape clusters as well as 300K bytes of memory and a card reader on each system.

Some keypunch and coding equipment was located directly below the fire's origin and was soaked by the water. It was moved to a temporary location, dried out and is now in fine working order, according to Bruce Garner, manager of the Facilities Management Department.

Except for the computer facility, most of the bank's operations have been moved to a vacant store nearby until the damage can be repaired.

The fire was originally discovered by a computer room employee working a late-night shift who saw smoke and set off a manual alarm. Authorities are still investigating why several automatic alarms did not sound a warning.

Once the alarm was sounded, employees immediately shut off the computer equipment, took the checks and other material that was being processed and left the building. Very few records were lost because of this action, Garner noted.

## Backup Sites

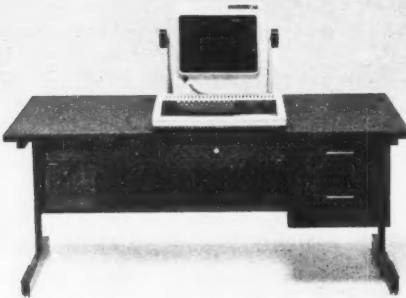
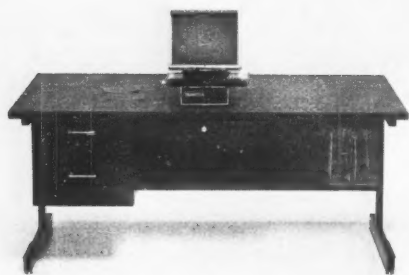
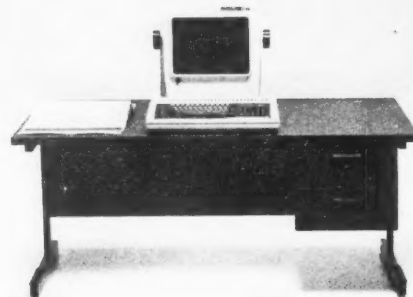
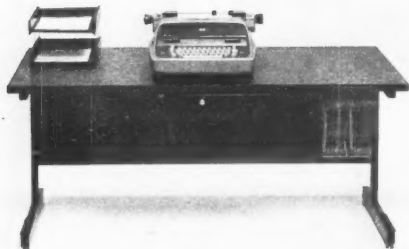
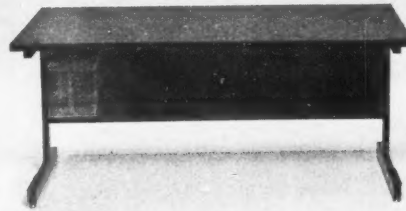
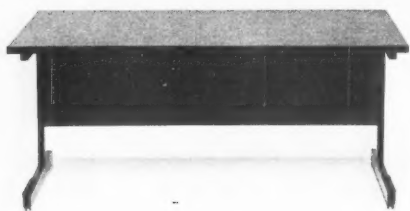
For the next several days, all data processing was performed in Philadelphia at backup sites arranged by Burroughs Corp. The bank leased a helicopter and trucks to shuttle information from its 43 branch offices to a local site where encoding and preparation work was performed.

From the local site, the data was transported to one of the sites in Philadelphia and, after processing, was shuttled back to Harrisburg — a distance of about 90 miles. About eight to 10 trips were made daily until Saturday, May 12, when the system was running in test mode.

On Sunday, actual processing work was begun and by Monday the bank had caught up on all of its accounts. To restore some of the electrical equipment and to test the computer equipment for possible damage caused the delay.

The backup sites used either B2800, B3800 or twin B4800 systems, so all the programs could be run directly on any of the machines without reconfiguration, according to Bill Rosener, the bank's vice-president of automation support.

(Continued on Page 21)



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## About 65,000 Refunds Involved Program Error Delays Tax Return Processing

By Marguerite Zientara

CW Staff

WASHINGTON, D.C. — A programming error caused a one-week delay in the processing of about 65,000 Internal Revenue Service income tax returns with schedules R, RP or E.

While the error was quickly discovered through a routine check on the master file and subsequently rectified, it did result in "very few" refunds made in the wrong amounts, according to an IRS spokeswoman.

"The programming error involved moving one field too many in going from the basic Form 1040 information to the Schedule R," she explained. "We were supposed to move seven fields, but we moved eight."

"That caused the extra field to back into the last field on the basic 1040 information and override it." The last field on the basic 1040 is the Estimated Tax Credit Election.

The error only showed up on basic 1040 returns with Schedule R, RP or E. "If there were intervening schedules, for example, itemized deduc-

tions, the same error existed, but it would not override into the Estimated Tax Credit Election and therefore would not affect the refund," she said.

In the few cases where the refund amounts were impacted, the result was either no refund — when the intended amount was put into the Estimated Tax Credit Election — or a miscalculation of

the amount.

While there "may have been a couple" of erroneous refunds sent out, most miscalculations were discovered before the checks left the IRS, the spokeswoman noted.

### Quickly Patched

The error showed up in the final report going out from the regional service centers to the

National Computer Center, where it was discovered. "The patch for the program was phoned out immediately to the service centers, and the problem was fixed within two days," she said.

At the time the error was discovered, those returns that were yet to be posted "caused no problem at all. The ones in the process of being posted

may have been delayed because they had to be taken out and rerun with the patched program," she explained.

The ones that had already been posted had to be manually corrected.

"No returns are being held up at this point, and there haven't been any since the first week in March," the spokeswoman noted.

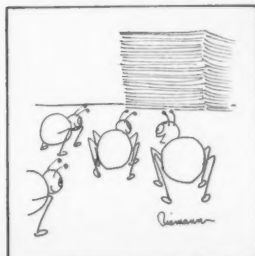
## Forethought Stops Ruin

(Continued from Page 20)

"We were extremely pleased with both the local and the district Burroughs staff people," Rosener said. They helped move the encoding operation, installed extra field engineers at the remote sites and were on standby to bring the equipment back, he said. "They bent over backward for us."

"We felt we had really done a lot of prior planning for just this kind of an emergency, and we're fairly happy with the results. Once everything is cleared up, we'll review everything and perhaps add some procedures."

"It's always possible to do more, but you really don't find out what until something happens. Planning provides the tools and although you can't plan for everything, it can give you the basic resources," Rosener said.



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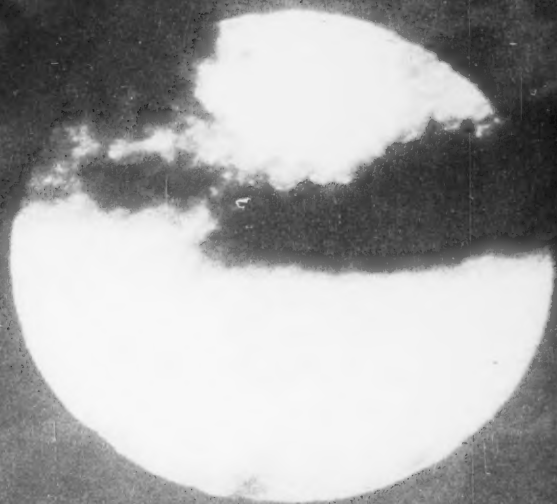
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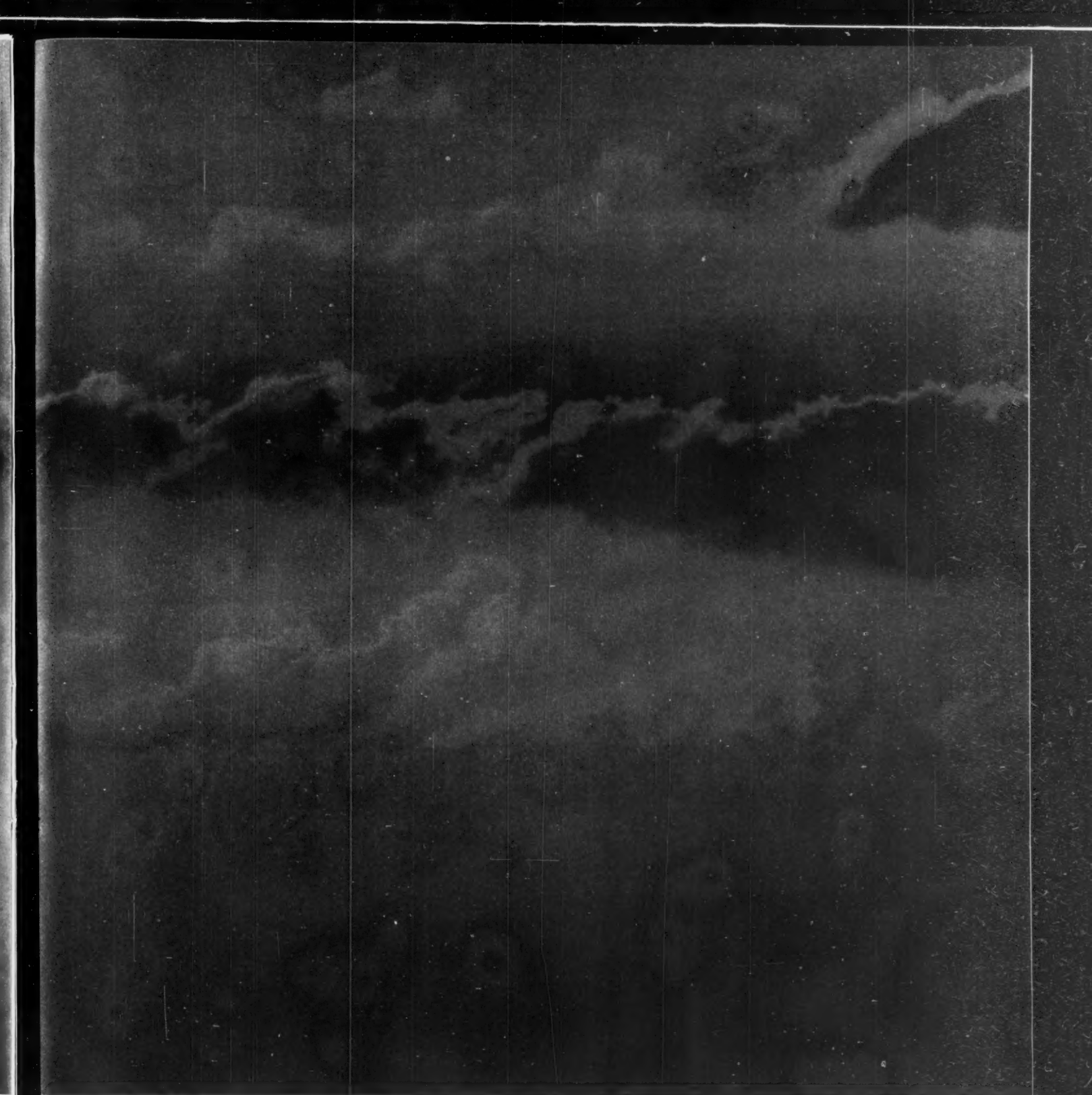
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# NETWORKS NOW.

## Newsletter On Graphics Set for July

CAMBRIDGE, Mass. — Important commercial, technological and product developments in the computer graphics field will be the focuses of a biweekly newsletter to be published by the Harvard University Laboratory for Computer Graphics starting in July.

"The Harvard Newsletter on Computer Graphics" will be geared toward users, prospective users and vendors and will spotlight the computer graphics industry from research and development to the final product, according to Allan Schmidt, executive director of the Harvard graphics laboratory.

Among the regular departments in the publication will be "News and Trends," "Products," "Markets," "Applications," and "R&D."

In addition to standard computer graphics applications, the newsletter will cover management and statistical graphics, computer graphics-aided design, engineering and manufacturing, image processing and other related areas, Schmidt said.

A 24-issue subscription to the computer graphics publication costs \$125, while a nine-issue trial subscription is priced at \$45. Additional information is available from the Laboratory for Computer Graphics, 520 Gund Hall, Cambridge, Mass. 02138.

## CAI in Language Focus of Group

SPRINGFIELD, Ill. — An organization dedicated to the development of computer-assisted instruction in rhetoric, basic and advanced writing skills, literature, linguistics, journalism and foreign languages has been formed here.

The Computerized Language Instruction Consortium (Clic), established little more than a month ago, has four objectives.

First, it intends to provide a forum for the exchange of ideas among developers and users of computer-assisted systems for language instruction.

Second, the group hopes to establish and maintain a library of computerized language lessons and reduce redundant efforts among developers of language lessons. Finally, Clic plans to provide consultation services to new users of computer-assisted language instruction.

More information on the group is available from Norman D. Hinton, Literature Department, Brookens Library 465, Sangamon State University, Springfield, Ill. 62708.

## Glassner Pleads Guilty to Billing Scheme

HAUPPAUGE, N.Y. — Larry A. Glassner has pleaded guilty in State Supreme Court here to one count of grand larceny in the third degree in a minicomputer-based false billing scheme involving every state in the union and possibly up to \$2 million in phony bills [CW, Jan. 22].

Glassner has been free on bail since his arrest last Dec. 23 following a three-month investigation. The investigation was initiated by a suspicious city attorney in Richland Hills, Texas,

who had received a bill for supplies he had never ordered or received.

A former chemical salesman, Glassner apparently ran two "semilegitimate" supply companies out of his home, according to a spokesman for Suffolk County District Attorney Patrick Henry.

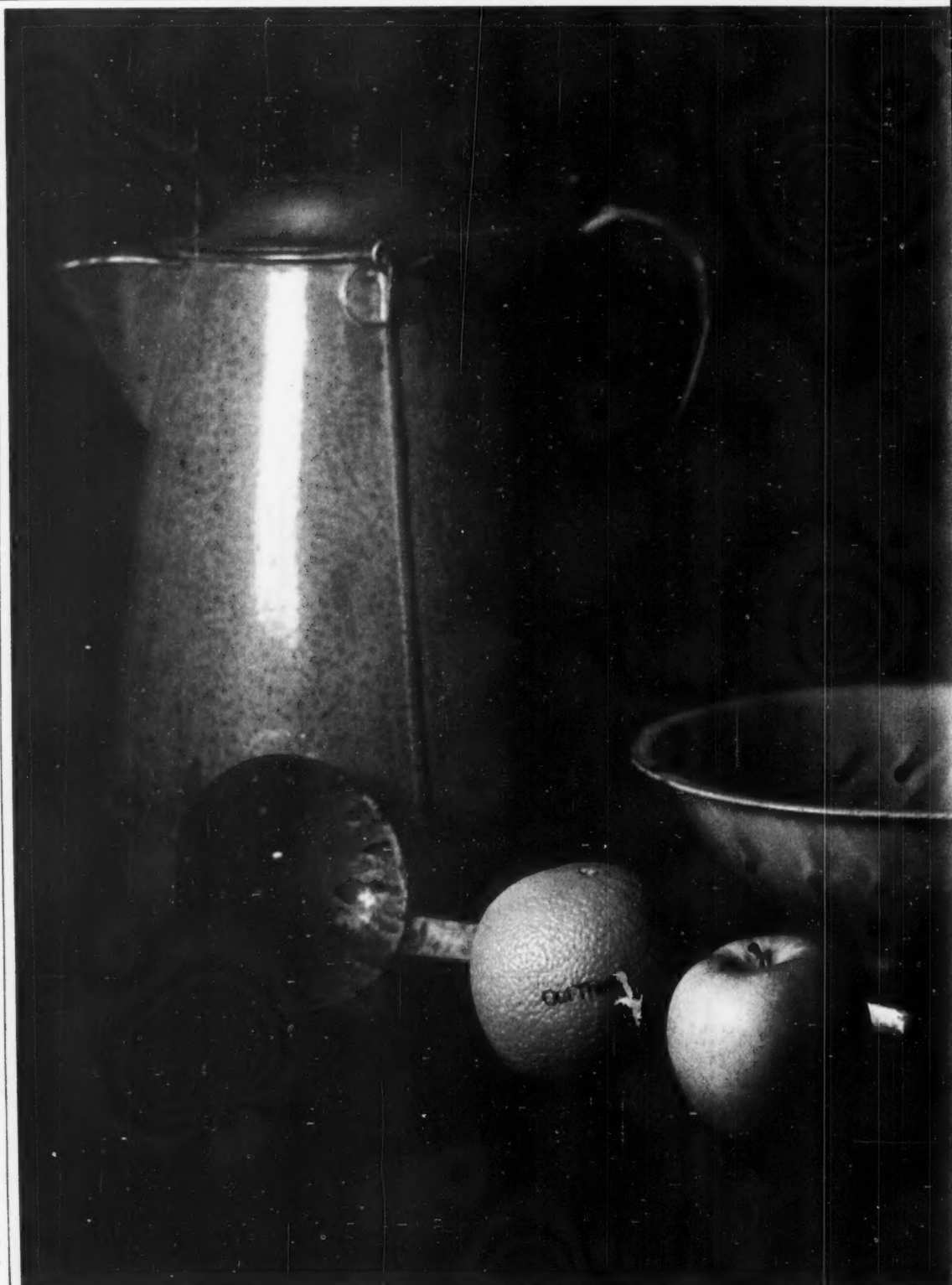
The investigation revealed that municipalities in all 50 states had received bills from Glassner at one time or another in the two years the alleged scheme is believed to have gone on.

The majority of victims were small towns that received and paid small bills, the spokesman said.

Furthermore, the Radio Shack TRS-80 microcomputer used to keep track of Glassner's billing schedule was allegedly obtained fraudulently.

Glassner has been on probation since 1977 for mail fraud. He now faces a possible two to four years in prison for larceny.

Glassner, currently free on \$5,000 bail, will be sentenced July 16.





# At Senate Hearings Communications Industry Hits Post Office EMS

By Jake Kirchner

CW Washington Bureau  
WASHINGTON, D.C. — The entry of the U.S. Postal Service into electronic mail services would represent an unwarranted government intrusion into a competitive industry already adequately served by private firms, Congress was told recently.

Taking their case before the

Senate Communications Subcommittee, telecommunications industry representatives said the Postal Service should be considered a common carrier under the regulatory jurisdiction of the Federal Communications Commission (FCC) if it eventually is allowed to offer electronic message services (EMS).

The issue is currently being

studied by the Postal Rate Commission, the FCC, the White House and Congress, where legislation has been introduced to forestall extension of the Postal Service monopoly to EMS [CW, April 2]. However, the May 16 Senate hearings marked the first time the issue was debated in the subcommittee's deliberations on proposed revisions to the

Communications Act of 1934. Executives from AT&T and Xerox Corp., whose Advanced Communications Service and Xerox Telecommunications network, respectively, would in part compete with the Postal Service's proposed domestic EMS offering, told the Senate panel there is a real danger the service would monopolize the market for elec-

tronic mail.

"The Postal Service currently seeks to enter the telecommunications field as a direct participant rather than in cooperation with private industry," Paul Likins, a Xerox vice-president, said. "Make no mistake about it, the possibility of a Postal Service monopoly is very real."

Franklin T. Julian, AT&T director of data telecommunications policies and planning, told the subcommittee that if the Postal Service is allowed to proceed with its domestic Electronic Computer-Originated Mail (Ecom) service, a joint venture of the post office and Western Union, "there is no doubt that private investment and service decisions would be adversely affected because of the inherent disadvantages of trying to compete with a government agency."

"Ecom is a communications common carrier service," he continued. If the Postal Service gets the green light for Ecom, "it would be appropriate that the [post office] be subject to the same FCC regulations as other carriers."

## Solution: Postal Link?

According to the Computer & Communications Industry Association (CCIA), "the long-term impact ... would be an absence of competition to any EMS offered by the Postal Service." Phillip S. Nyborg, CCIA vice-president and general counsel, offered the Senate subcommittee "a competitive solution to this problem."

(Continued on Page 29)

## Comparing a Datapoint ARC™ system to a conventional computer is like comparing apples to oranges.

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### Out-Think No. 1: Building Block Architecture

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### Out-Think No. 2: More Productivity

The interprocessor bus (which links all the processors in the system together) coordinates all data transfer, relieving the individual processors from communications overhead. This is another reason why an ARC system's productivity will often exceed that of a large conventional computer, no matter how many separate processors there are, or where they happen to be located. Each component does its assigned task faster and more efficiently because that one job is all it has to do.

### Out-Think No. 3: More Efficiency

As an ARC system grows, the information base doesn't have to be divided, partitioned or duplicated. You start with a shared database and simply keep on sharing it. File security is simple to use, yet safe. You can selectively restrict access to parts of the database in a number of ways.

Other components are shared as easily. Printers, for example, can be kept at work full time. The work can be stored, then turned out on whatever priority schedule you want.

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It's easy to add new work functions to an ARC system. You add just as little or as much computing power as you need to handle your current work load. There's no wasted time caused by an

overloaded computer and no wasted, expensive overcapacity.

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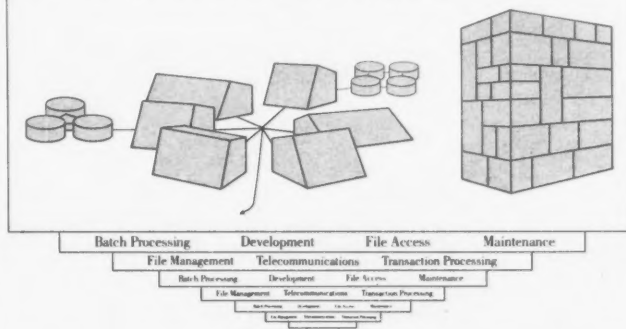
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# Bloomie's Shoppers Access Jewish History Data

By Marcia Blumenthal  
CW Staff

NEW YORK — Crowds gathered here last week around a CRT terminal and printer nestled between the lamps and fine china on the fourth floor of Bloomingdale's department store.

But it wasn't for a showing of the chic department store's new summer line of computer peripherals. Rather, the equipment was part of a three-week storewide festival called "Israel: The Dream."

The terminal and printer were part of an information system used to store a data base on the history of 3,000 Jewish communities throughout the world — a project that was likened to a "Jewish Roots."

The festival also featured exhibitions from several Israeli museums and appearances by noted Israeli artists and personalities.

Bloomingdale's information system duplicates a permanent exhibit at the Museum of the Jewish Diaspora on

the campus of Tel-Aviv University. That museum traces the dispersion of the Jewish people as they settled into communities throughout the world. The Hebrew name for the museum, Beth Hatesufoth, means House of Dispersion.

Making extensive use of technology in mounting its exhibits, primarily audio-visual techniques, the museum also has a Digital Equipment Corp. PDP-11/70, an RP05 disk unit with 30,000 blocks of information, four CRT terminals and a printer, accord-

daica, the authoritative source of Jewish history, the data base took more than 2-1/2 years to construct, Weinberg said.

A team of seven researchers worked a year and a half editing and translating the encyclopedia, and four programmers and systems analysts spent another year adapting the information to the computer.

Fortunately, the encyclopedia, which is written in English, is stored on magnetic tapes, so the CPU did some of the basic editing, Weinberg recalled.

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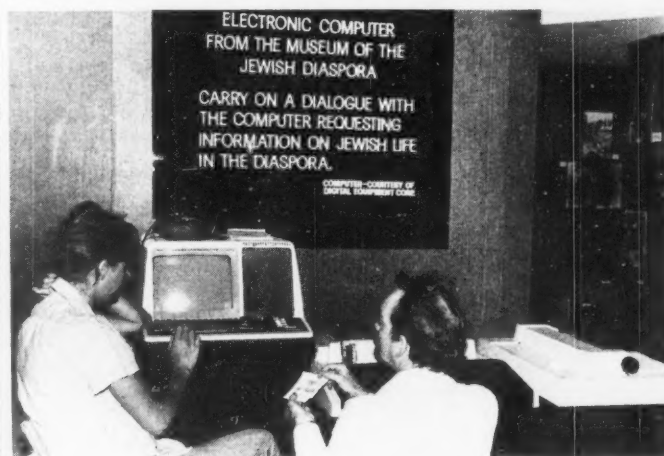
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CW Photo by M. Blumenthal

Bloomingdale's visitor requests information on Jewish life.

ing to Museum Director Jesaja Weinberg.

### Back to Middle Ages

The data base includes information on Jewish settlement in established communities outside of Israel dating back to the Middle Ages; demographics of the Jewish population within the community as it changed

A major snag in adapting the data arose because the museum wanted to store it in both English and Hebrew. Hebrew is written from right to left.

In selecting equipment for the project, Weinberg said the museum was "looking for a system that was economical and had the proper software backup."

Before finally choosing the DEC equipment, the museum considered an IBM system. "But the IBM equipment offered was too powerful and too complex for the job," Weinberg explained.

Although he hasn't worked as a computer professional for 20 years, Weinberg, who emigrated to Israel in 1933, saw the value of computerized information banks in the late 1950s. At that time, he was the assistant director of the Office of Mechanization in the prime minister's office in Jerusalem and was responsible for implementing a computer system within the Israeli Civil Service.

Visitors to the museum — or to Bloomingdale's — who wish to find out more about a particular Jewish community type in the name of that town on any one of four CRT terminals located in study areas in the museum.

If they don't know the exact spelling of the town, they type in a name that sounds similar. The screen then displays a list of names and the visitor makes another choice.

As visitors leave the museum, they give a museum employee a number assigned from the CRT display and receive a printout about Jewish life in the requested community.

Like the museum visitors in Tel-Aviv, those gathering around the terminal at Bloomingdale's were fascinated.

Although the processor at the museum is located on the premises, Bloomingdale's uses two telephone



Jesaja Weinberg

from the time the first Jews settled there to the present day; the political, religious, cultural and industrial activities of the Jews within the community; and the degree of assimilation Jews achieved in the community's life.

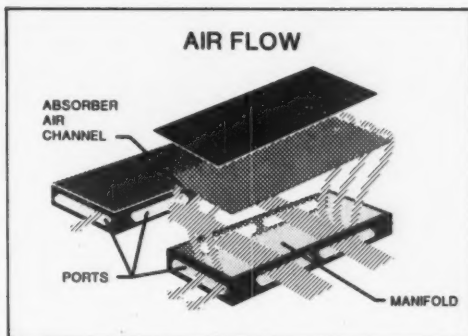
Detailed information explaining the persecution of Jews, particularly those in Europe, and the effects of various pogroms and ultimately the Nazi regime on the population within these communities are critical parts of the data base.

Gathered from the *Encyclopedia Ju-*

(Continued on Page 28)



## Artist Making a Go Of Media Firm Based on DP Graphics



By Marguerite Zientara  
CW Staff

DALLAS — Roger Haney had 18 years of artwork behind him — but neither DP experience nor capital — when he set out to establish a computerized media firm here more than a year ago.

As it turned out, Haney had all he needed in the know-how department, and he soon acquired all he needed in the pecuniary province.

Through two investment banker friends, Haney got the funding for the media firm project, which was originally spawned after he viewed a General Electric Co. Genigraphics system in operation. Media Matrix, Inc. is based on the Genigraphics system and requires no computer background from its artists, presently numbering four.

Using the computer-based graphics system, the firm makes slide presentations to be shown at shareholder meetings, analyst meetings or any place a client company wants to use visual presentations to tell its story.

Media Matrix's specialty is making detailed charts and graphs showing anything from the client's growth in earnings to its product diversification.

While the firm offers graphics services similar to those of other companies, Media Matrix's presentations are produced completely by computer. The designs reproduced here give a sampling of its work, while possible variations approach a seemingly infinite number.

A number of large corporations around the country have their own GE computer-based graphics systems in house (Digital Equipment Corp., AT&T and Bell Telephone Labs among them), but Media Matrix claims to be

the only company in the Dallas area to offer such services to the public at large.

"We have small, medium and large clients," Haney noted. "Size is not a consideration; we'll print one or a thousand slides for a customer."

Media Matrix opened its doors for business last Oct. 1; the equipment arrived Oct. 15. The employees were trained and ready to go "full speed ahead" by Nov. 11, according to F. Joe Bosler, the firm's president.

Now, five months later, Media Matrix boasts a long list of clients that includes American Airlines, Recognition Equipment, Inc., Rodeway Inns, First International Bancshares, Inc., Dallas Power & Light and the Mercantile National Bank of Dallas.

### Bar Graphs, Pie

GE's Charts & Graphs software package comprises the basis of Media Matrix's graph production by allowing interaction between the artist and a Genigraphics Model 241 graphics terminal. The system stores information on every tape of chart or graph produced by Media Matrix. For example, for a bar chart, the computer has all the possible type and bar sizes stored in memory. The computer compiles them as directed by an artist in order to tell a client's story.

In the case of a pie chart, the artist just types the percent of the pie to be dissected and the computer automatically produces the image of a pie divided in those dimensions. A further command to the system causes the pie to tilt at a desired angle, giving a three-dimensional effect.

"At present, we have about 1,000 generic symbols and logos in the computer," Bosler said, "and that number

is expanding daily."

"For instance, we have a map of the U.S. that can be used in many ways. We can pull out any geographic region of the country for a slide by plugging in the right commands."

### Tablet Digitizer

For logos and fonts that are not stored in the computer, the artist creates them on the system's tablet digitizer. As the figures are drawn by hand on the light board, the computer records the drawing in memory.

Then, when the drawing is completed, it can be called up at any time on the CRT screen and perfected by the artist using computer commands. The digitizer essentially converts rough sketches to smooth, finished art and makes precision tracings of complicated graphics for processing.

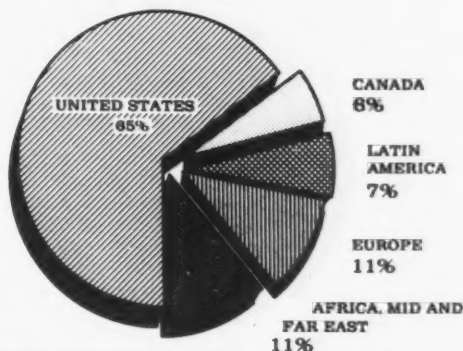
For example, on the American Airlines logo, the artist digitized the eagle by tracing it on the digitizer, then shadowed the "AA" lettering to make the letters stand out.

"Now we have American's logo stored on floppy disk," Bosler said. "It will be very inexpensive for us to reproduce that logo on any American Airlines slide. We will just call it up on the terminal and place it anywhere on the slide in any size."

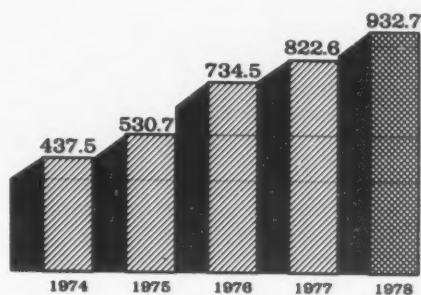
### Unlimited Colors

The system offers 91 basic colors; variations among them bring the choice up to 8.5 million. "One of the biggest advantages of the system is the virtually unlimited color palette," Haney remarked.

### 1978 Sales Percent



### CAPITAL Millions of Dollars



Media Matrix's four artists work in two eight-hour shifts. When both shifts are over, the artists turn the work over to the computer system.

Overnight, the system's film recorder, equipped with two cameras, photographs all the slides produced that day in both black-and-white and color; the next morning the film is developed. The slides are usually ready by noon.

While Media Matrix presently produces only raw film which must be taken out to be developed, "the importance of guarding corporate information before it is published in annual reports may cause Media Matrix to start developing film itself," Bosler said. Plans call for such a move within six or eight months, Haney added.

### Negative Aspects

Although he considers the system "fantastic" ("our production level per artist is 10 times what it would be otherwise"), Haney noted that there are negative aspects for artists working in this technological arena.

"You spend a lot of time working and you don't have anything physical to show for the work you do," he explained. "You work in the abstract a lot and it's kind of hard to grasp that concept to start with."

Drawing with the tablet digitizer is not without its limitations, Haney noted. "You can actually draw and create pictures and different lettering fonts by hand on the digitizer, but obviously you're limited because you're working on a TV monitor. It's not like working on a piece of paper."

# IBM 8100, System/38 Found Confusing Users

By John Whitmarsh  
CW Staff

BOSTON — End users are confused and reeling from the one-two introduction of IBM 8100 and System/38 computers last fall, according to C. Oakley Mertz, vice-president for research at International Data Corp. (IDC).

Mertz told attendees at a small systems seminar here that IBM has not communicated enough information about the applications of the 8100 series or the System/38, both of which were introduced only weeks apart in October. Introduction of the 4300 series in January has added to the confusion, he said.

Mertz based his comments on a recent IDC survey of users of all sizes of

IBM equipment.

"We wanted to learn if there was an easy differentiation in the minds of IBM's Data Processing Division (DPD) customers between the 8100, which is marketed by DPD and is in our opinion intended to be a distributed processing node, and the System/38, which is marketed by IBM's General Systems Division (GSD) and is simply a small business computer and a System/3 upgrade with little relevance to the large DPD customer," Mertz said.

The survey found that only 23% of DPD customers believe the 8100 and System/38 are noncompetitive. The remaining responses were evenly divided between customers who simply did not know if the two systems

were competitive and those who believed the systems were indeed competitive.

"To me, that says that IBM users are confused," Mertz said. "At this point, IBM has not gone to its users and made clear to them where these new systems fit in the hierarchy."

## Query on Series/1

Another survey question went a step further, asking if customers saw a different role for the Series/1 than for the 8100 or the System/38.

Only 30% of DPD customers believed the Series/1 was noncompetitive with the 8100 or System/38, the survey found. The remaining responses were evenly divided between customers who sim-

ply did not know if the Series/1 competed with the 8100 or the System/38 and those who believed the Series/1 did have a different role.

"To me, the Series/1 does have a different mission in life," Mertz said. "It's a minicomputer, but again, IBM is confronting the user with a wide variety of products and not educating them enough about the strengths and weaknesses of each."

Mertz said that sorting out the IBM models is confusing enough for end users. But confusion is compounded when a user must comparison shop with other manufacturers to find the best system to meet his needs.

## Intracompany Competition

Another finding in the IDC survey revealed that 85% of IBM customers believe that DPD and GSD compete.

One other finding was that 30% of DPD sites had been visited by a GSD salesman. "That's especially interesting because in a sense, those GSD salesmen do not have a lot of business calling on those DPD sites," Mertz said.

This apparent competition between IBM divisions contrasts with sales behavior during the introduction of the Series/1. At that time, IBM established a system in which GSD salesmen reportedly could not knock on large system users' doors unless invited by a DPD salesman.

But the recent invasion of DPD territory by GSD salesmen confirms original reports [CW, Oct. 23] that IBM was moving toward more independent — and therefore more competitive — operating divisions.

Mertz refused to speculate on IBM's motives for its latest behavior. "IBM is beating the drum and generating new orders on both the 8100 and the System/38, and I believe the company will sort it out over time."

"It is unfair and premature to draw a conclusion about IBM's motives only seven months after introduction of these new systems," he said.

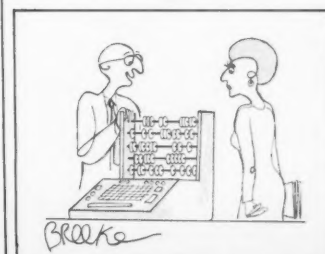
## Shoppers Access Historical Data

(Continued from Page 26)

lines to access a processor at a local service bureau.

Terminal operator Pnina Berkowitz estimated that at least 100 people a day find their way to the fourth floor nook to request information about their native communities.

Visitor Esther Wein, who emigrated to the U.S. in 1922, was amazed about the detail in the printout on her native community of Cherkassy in the Ukraine. "I lived through some of those early pogroms," she said.



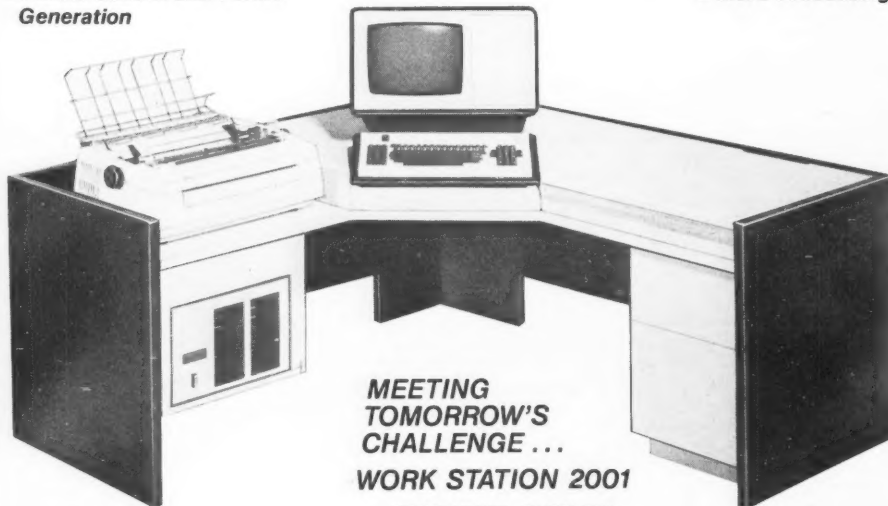
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## Inside Job Suspected

# Three ATMs Robbed of Almost \$100,000

By Ann Dooley

CW Staff

BROOKLYN, N.Y. — Nearly \$100,000 was stolen from three Citibank automatic teller machines (ATM) here recently after two men seized the keys and combinations needed to open the machines during an early morning raid on Citibank's Brooklyn regional office.

Police suspect the robbery was an inside job because the

two knew exactly what to look for and where to find the keys and combinations.

The two men, armed with revolvers, entered the locked regional office with an electronic key about 2 a.m. on May 13. They overpowered a security guard and two other employees who were processing check transactions, tied them up and broke into a cabinet

containing the keys and combinations that open ATMs at 40 bank branches in the Brooklyn and Staten Island region, a Citibank spokesman said.

The two then fled, but not before using their booty to open an ATM in the building and escaping with \$45,000 in cash, according to police.

In the meantime, the three

bank employees managed to free themselves and called the police. About two hours after the initial burglary, bank security officers began visiting the 40 ATM sites to change the combinations on the machines, but found that two other ATMs had already been cleaned out.

The thieves reportedly confiscated \$34,000 at one self-

service money dispenser and an additional \$20,000 at another.

The two men remain at large, although local police and Federal Bureau of Investigation agents are investigating the case.

A Citibank spokesman who asked to remain anonymous could not recall anything of this kind happening before.

## Post Office Hit for EMS

(Continued from Page 25)

Nyborg proposed that "any communications carrier authorized by the FCC to provide EMS should be permitted to interconnect with postal facilities in the same manner as the proposed Ecom service. That is, any communications carrier transmitting messages electronically could interface with a 'destination' post office, where such messages would be reduced to hard copy and inserted into the mailstream."

In this way, "rather than a single EMS provider such as Western Union, a multitude of competing EMS providers would be utilizing postal facilities for local delivery and the demand for such facilities would be stimulated accordingly. This would result in increased Postal Service revenues without requiring the service to invest heavily in EMS transmission facilities."

Later in the hearings, Deputy Postmaster General James Conway rebutted arguments that the Postal Service seeks to expand its monopoly to electronic mail or desires to own or operate telecommunications networks. "The Postal Service would rely totally and exclusively on the private sector for telecommunications services which the private sector is willing to provide," he said.

Furthermore, the Postal Service's position on EMS is that "the postal monopoly does not apply to electronic transmissions and should not be changed in this regard... At the same time, the Postal Service does not wish to be precluded from using modern cost-saving means to provide more and more economical services."

Conway argued that "the Postal Service is going to be involved in and affected by electronic communications whether or not it seeks such involvement. New communications technologies present a significant potential source of alternatives to traditional letter mail."

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## Could Be Used in U.S. in Two Years Technique Aids Forecasting of Political Crises

By Marguerite Zientara  
CW Staff

PITTSBURGH, Pa. — A computer-based technique for forecasting the likelihood of rapid change in the politics of countries in crisis could become "a working tool" in the U.S. within two years, according to its originator.

A statistician at Carnegie-Mellon University, George T. Duncan has been working on the method for two years under the sponsorship of the Department of Defense (DOD).

Engaged until now in "passive forecasting," Duncan explained that the next phase of his research will involve trying to determine the impact of vari-

ous actions on a given political situation. Currently, "we take the role that we are a Martian looking at the world down there and trying to forecast what's going to happen, just as an interested bystander," he said.

So far, his passive forecasting has accurately predicted a number of major world events, including the actions following Israel's incursion into Syria on March 15, 1978. "Our procedure indicated a high probability of the situation going to a state of war between Israel and Syria," Duncan noted, "and it was at that point that the United Nations sent in a peacekeeping force that kept the two armies apart."

While his predictions played no role in the UN response to the Israel-Syria situation, Duncan noted that the precision of his projection was "gratifying."

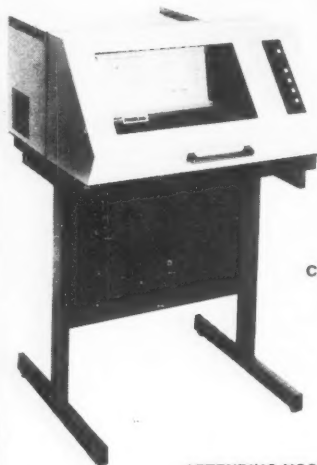
Collaborating with Brian Job of the University of Minnesota, Duncan is presently working on the racially tense situation in southern Rhodesia, still using the passive mode of forecasting.

Because national leaders often are not simply "interested bystanders" when observing international politics, however, and can in fact influence what is going to happen by effecting policy changes, "we would like to develop some methodology to allow [us] to analyze the probable effects of certain policy alternatives," Duncan said.

In addition to the forecast based on the analysts' answers, Duncan explained, the program modifies the initial subjective judgments of the analysts on the basis of incoming data "in a standard Bayesian updating mode."

While computers have been used in the past to predict war and peace among nations [CW, March 20, 1974], previous procedures have been statistical, based on previous data, while Duncan's method "very heavily depends on the subjective input of international relations analysts, which is then combined with data."

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#### Infusing Sense of Uncertainty

Duncan, who has long been an observer of international politics, began the project with a desire "to infuse into international relations analysts a full appreciation for the uncertainty involved in carrying out international relations forecasting.

"I wanted to introduce explicitly the ideas of probability," he explained, "and I wanted to make sure the probabilistic aspects were not ignored when international relations analysts were reporting to international relations policymakers."

Duncan feels that his research, if successful, could help the nations of the world react more rationally to political events. "I think there would be less adventurous actions on the international scale if one had a better understanding of the alternatives and what might take place."

In making his predictions, Duncan uses Carnegie-Mellon's 512K-byte Digital Equipment Corp. Decsystem-2050 and a 975 line/min Data-products Corp. LP20F printer, accessible from his office through a Perkin-Elmer Corp. Model 1100 Fox CRT terminal.

#### Processing Input

Input comes from international relations analysts who are interrogated via an interactive computer program written by Duncan's two research assistants.

The analysts are asked "fairly easily answerable" questions about what they anticipate might happen. For example, an analyst might be asked, "If one of the following five conditions were to come about [in a particular situation], what is the likely number of times out of 100 that condition number one would come about?"

The answers are then used to estimate the parameters of a probabilistic model called the Markov Renewal Model, Duncan said. "We use the Markov Renewal Model to generate short-term probability forecasts up to 30 days into the future," he said.

Each forecast indicates the likelihood that the particular geographic area being studied will be in a certain specified condition on a certain specified day.

The research team uses a time period of 30 days because "the international system is so dynamic, so subject to structural change, that our forecasts would not be valid more than 30 days into the future," Duncan said.

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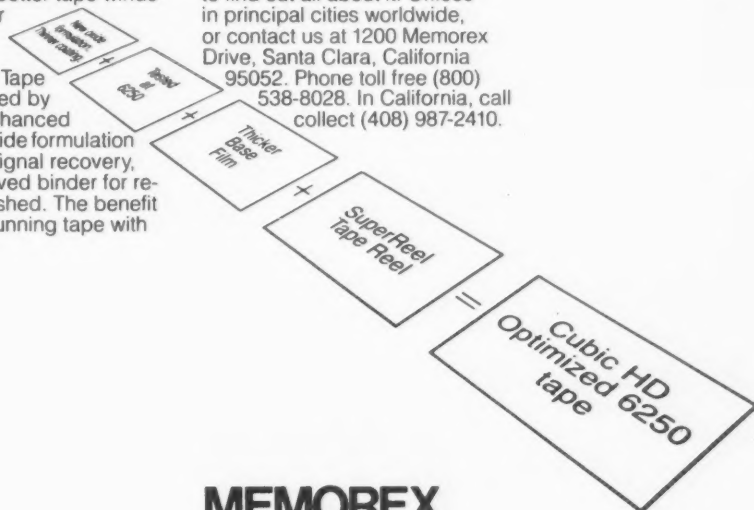
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# Space Shuttle on Target Despite Software Delay

By Jay Woodruff

CW Staff

HOUSTON — Despite delays in the delivery of simulation software, the space shuttle's primary and backup crews and mission controllers here are expected to be fully prepared for a Nov. 9 launching.

The crew and mission control have been able to practice ascent and descent, but it was not until recently that the complex software and tapes were available for orbit simulations. IBM provides the primary flight software, while Rockwell International, Inc., in conjunction with MIT's Draper Lab, supplies the backup designed to return the crew safely to earth in case of a primary software systems problem.

The simulations are run aboard the

space shuttle simulator here in the Johnson Space Center on an IBM AP101, the same 128K-byte computer that will be used by the space shuttle crew for the flight in the late fall. The IBM CPU is interfaced to a Univac 1146 mainframe.

Prior to April 30, "we could not run in-orbit simulations," Carl B. Shelley said. "Now we have a version of that and we expect an updated version at the end of this month."

"By the end of June, when we receive another software load, it should represent the ultimate capabilities we will need for the flight. We don't anticipate having problems meeting the November launch date," the deputy chief of the crew training and procedures division stated.

An updated "load" of software is sent to the center once a month. The load includes a version of the flight software and the host computer software for the simulator, with the latest definitions of all the parameters needed to plan the flight, including the comestibles that go into the vehicle.

One of the simulations that took longer than expected to make up involved the "reset points" that allow the program to be set up and run from any location in the orbit, Shelley said.

## Training Flight Crew

Simulation is used primarily to train the flight crew and its backup and secondarily to train mission control flight personnel. "All the things that come into the control center during a flight

are generated in this simulator and tied into the control center," Shelley explained.

Once a crew has shown a mastery of the major elements of part of a flight, the "full task" simulation — what the deputy chief called a "one-for-one time-line reproduction of the actual flight environment" — is run in real-time.

After the crew is "at least semiproficient in handling that situation, we will crank up the mission control center in concert with the simulator, tie all these interfaces together, including a simulation of the ground tracking network, and time-phase all interaction between the crew and ground that would exist in the real world."

## Contingency Situations

Once everyone is comfortable working through the procedures as they are supposed to happen, contingency situations are introduced to train crew members and ground control to plan alternate procedures and reconfigure systems to work around whatever problems arise, Shelley said.

One contingency situation that has not been rehearsed is the switch from the IBM software system to the "bare-bones" backup system from Rockwell, simply because "we still do not have the backup flight systems functioning in the simulator from a flight control point of view. Systems management parts are here, but not the backup flight systems," the deputy chief said.

Separate software contractors were chosen for the primary and secondary software so a generic defect in one would not occur in the other, he explained.

The flight crews do not spend all their time in the simulators; of their 60- to 70-hour weeks, each crew spends approximately 20 hours there. The simulator is used an additional 24 hours a week for validation and verification of procedures still under development.

Although the software, crew and mission control are expected to be ready to go on time for the launch from Kennedy Space Center Launch Complex 39, officials are not so confident about the shuttle itself.

The tiles that will shield the craft from intense heat during reentry into the Earth's atmosphere have been difficult to affix to the craft, and only recently have the correct bonding agent and a time-consuming application technique been developed to make the tiles stick.

A fire occurred in the main engine recently, apparently caused by a structural failure. The fire is now being evaluated for its effect on the flight schedule, Shelley said.

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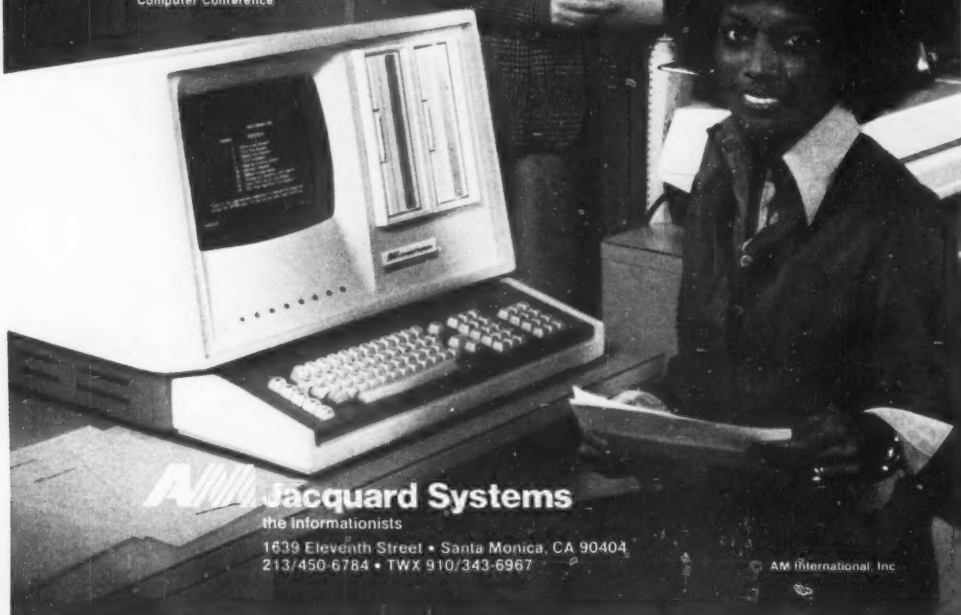
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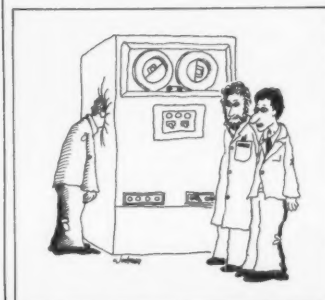
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CW6/4/79

# Desert Town Gives Birth to Fertile T/S Business

SANTA FE, N.M. — Running a time-sharing business in a colorful small town has more rewards than just monetary income, according to Don Fry, who operates Southwestern Computer Services here with a lot of cooperation between himself and his customers.

"I started a computer operation out here in the early '70s and ended up getting into a highly personalized service business," he said.

Business in this desert area requires an unusual amount of customer support — all the way from extra help with business problems to dragging somebody out of a ditch in the snow, he said. However, when Fry has a problem, customers offer assistance instead of ranting and raving; they even give up Saturdays and Sundays to come in and help straighten things out.

Fry first came to New Mexico in his youth to work on a ranch and returned often after that. Between visits, he grew up with the computer industry in the 1950s and '60s, working on his own and consulting for such companies as General Electric Co., RCA Corp., IBM and Memorex Corp., primarily in hardware and software development for time-sharing systems.

But Fry had fallen in love with Santa Fe, and when the computer business slowed in 1969-1970, he decided that the time had come to move here.

## Right on the Money

It didn't take long for him to see that there were many small businesses in town that could benefit from a time-sharing service. "I realized, however, that I was a long way from everything technical," Fry recalled, "and I was nervous about service and support for a computer installation in this kind of location."

Fry kept looking for a suitable system. Eventually he learned that a group of computer professionals he had known previously were forming a company called Basic Time-Sharing, Inc. (which later became BTI Computer Systems) to produce the kind of system he needed.

Almost immediately after looking at the BTI minicomputer system in operation, Fry made the decision to start Southwestern Computer Services.

"It looked like the system would support enough simultaneous users and return a good revenue per month," Fry said. "And that's the way it worked out — with about 50 users, there are seldom more than 12 calling in at a time and my revenue projections were right on the money."

Fry started with a BTI 300 (Serial No 6). The CPU has

been upgraded since then, but otherwise the original system continues in use.

The system has been "super-reliable" — ideal for a remote location — and Fry uses BTI's round-the-clock telephone maintenance for solving routine problems, he said. This ability to access and troubleshoot the system directly over the telephone eliminates unnecessary visits to customer sites by service personnel.

Under a cooperative maintenance program with BTI, Fry assists in corrective maintenance by exchanging or replacing system modules. "My maintenance cost averages about \$200 a month," he noted, "compared with roughly \$450 that I would have to pay monthly for a traditional service contract, and I've never had a system software problem that really took the system down."

Southwestern Computer Services uses the system to do basic small business accounting — payroll, general ledger, accounts receivable and accounts payable — using general-purpose programs that the service bureau owner tailors to the requirements of small businesses.

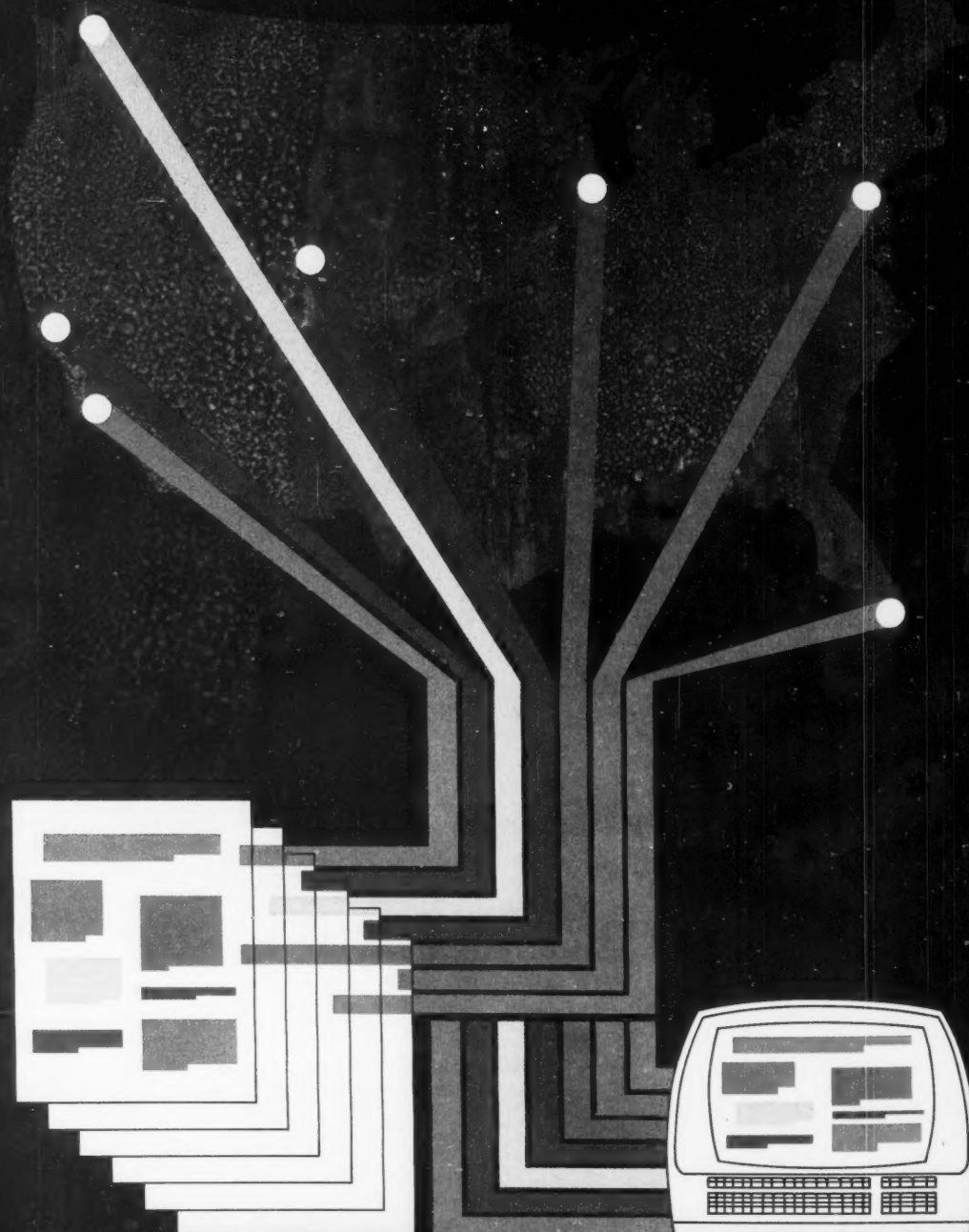
A typical Southwestern Computer Services customer has a small office with one person using the terminal in

addition to handling a variety of other jobs. Fry's revenue from this typical customer runs about \$400 a month, including a terminal, computer time at \$5.50 an hour and a charge of 10 cents per physical computer record.

The BTI system at Southwestern handles payroll for more than 10,000 people — some paid weekly, some bi-weekly, some monthly. It also

(Continued on Page 36)

## Announcing a major breakthrough in Query/Report Writers:





## Due in '78, Delayed by Revisions President Gets Report on Federal DP Revamp

By Jake Kirchner

CW Washington Bureau  
WASHINGTON, D.C. — The long-overdue final report of the President's Reorganization Project for Federal Data Processing has been delivered to the White House.

Although the initial findings of the reorganization project were made public last fall [CW, Sept. 11] and the final

report was expected by the end of 1978, last-minute revisions and comments from various agencies and interested parties delayed delivery of the document until a few weeks ago.

It has not yet been presented to President Carter, but "the report has been circulated extensively within the executive branch," according to Walter

Haase, deputy associate director for information systems at the Office of Management and Budget (OMB). "Views and comments are being exchanged; it's been provided to people who are looking at the OMB organizational structure; various options on how best to handle it are being considered."

The primary findings of the

study are that "the federal government is irreversibly and increasingly committed to information technology," is "in general, mismanaging its information technology resources" and has not developed a plan for exploiting future technology, Haase said. The report goes on to recommend specific steps for improving eight areas of govern-

ment DP.

Haase said a number of the report's recommendations have been implemented since the reorganization project got under way almost two years ago. "A tremendous amount of things have already been put in place — all of which were included as recommendations in the earlier [draft] reports."

The reorganization project consisted of 10 individual teams comprised of 55 people drawn from the public and private sectors. Each team produced a report on a separate aspect of government DP such as procurement, standards and personnel. The final report was based on the 10 team reports.

Discussing the project, Haase said, "to a large extent, we feel this study has already been helpful because in it we have an attention-getter to the kinds of problems that exist and need to be addressed."

The reorganization effort, he explained, "has run in parallel with a number of other things." Some of the individual team reports were delivered almost a year ago; "in the meantime, a lot of other reforms were being implemented ... and were in fact implemented prior to — or shortly after — some of the individual team reports came out."

### Changes in the Works

As described by the OMB official, the agency has already acted on some of the changes recommended in the report:

- OMB is developing a policy that will require agencies to account for the full cost of their DP activities, establish prices and procedures to recover their costs from user organizations and allow users to choose whether they want the agency's services on the basis of service performance and costs.
- OMB has incorporated zero-base budgeting and multiyear planning processes into government DP and telecommunications operations.
- OMB has refined its policy for contracting for DP services [CW, April 30].
- The General Services Ad-

(Continued on Page 36)

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**SEE PAGE 77**

## Desert Town Found Fertile for T/S Business

(Continued from Page 34) maintains 200 sets of books, roughly 80% for small operations such as doctors' offices and Mom-and-Pop businesses. But the other 20% are more complicated records that involve cost accounting for contractors and the like.

Along with this, Southwestern Computer Services writes more than 8,000 payables checks and prepares about 15,000 statements a month.

"That's a load," Fry said.

The actual printing is handled at the terminals that Southwestern has on customers' premises. Fry's largest customer has about 400 employees with two different payroll cycles. It's probably not printing more than 250 checks in one day," Fry explained. "At a rate of about three checks a minute, that's 180 an hour, so it can complete the job in about an hour

and a half — nobody gets excited."

### Expanding the Service

Even though he tried, Fry could not avoid contact with a big city. Over the years, several of his customers moved from Santa Fe to Albuquerque, about 50 miles to the south, and they wanted to continue with Southwestern. So, in spite of his reservations, Fry wound up serving five or

six businesses in Albuquerque by phone.

Then, in 1978, several things happened that pushed Fry into expanding. First, he reached the point where his system was handling as many customers as possible without causing unreasonable delays in service. Second, additional business was developing in Santa Fe, as well as in Albuquerque.

Putting these elements to-

gether, Fry installed a BTI 4000 system in Albuquerque, made arrangements with a former associate to run the office there, transferred his Albuquerque accounts to the new system and made room on the system in Santa Fe for new customers.

## DP Report Arrives Late

(Continued from Page 35)

ministration (GSA), which is responsible for overseeing government DP procurement, has raised the dollar threshold from \$50,000 to \$300,000 for blanket delegations of procurement authority for individual agencies [CW, Dec. 25-Jan. 1].

• GSA is developing a certification program to allow qualified agencies to perform all their competitive DP procurements on their own authority [CW, March 12]. This concept of "earned autonomy," Haase noted, is a major recommendation in the reorganization report.

### More Than 50 Actions

Haase said the government has taken steps to establish a better DP standards program, instituted research and development schemes, boosted the budget across the board for federal DP activities and moved to provide better career paths for federal DP professionals.

In fact, in a recent public appearance, Haase described more than 50 recent actions taken by various government agencies and departments to improve federal DP use.

"I don't want to say that more cannot or should not be done," he said, but some of the report's recommendations are "controversial," and decisions will have to be made by the President, keeping in mind OMB's "limited resources."

As reported earlier, the final version of the report backed off from an initial recommendation that the White House establish a position of special assistant to the President for information technology policy, plans and programs [CW, Nov. 20]. That recommendation, however, was contained in a minority statement forwarded to the White House as part of the final report.

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# DP Illiteracy Held Future Learning Handicap

By Jay Woodruff  
CW Staff

TALLAHASSEE, Fla. — As education grows more dependent on home computer systems, a lack of computer literacy could place many people at a learning disadvantage, further polarizing society into rich and poor.

This prediction was made by Dr. Arthur J. Lewis, a University of Florida education professor who stressed the importance of making computers available to all who need them as a means of minimizing that learning gap.

Lewis, who has presented papers on the relationship of social and economic forecasts to both future and curricula and to the organization and administration of schools of the future, said

the information explosion will require skilled workers to attend school for retraining at least four times in their lives to keep pace with changes, prompting those with the ability and interest to continue learning.

This requirement is based on the assumption that information will increase fourfold by the time a child born today graduates from college and 32 times by the time the child reaches 50 years of age.

"In the past, we've been able to retrieve information from books, magazines and the like, while in the future, we'll be retrieving information from computers," Lewis said. While he does not advocate that everyone learn to program computers in order to achieve literacy because "it would be impractical," they should at least know how to ask the right questions to begin solving learning problems.

"We can't anticipate the problems that people are going to face." Education will become a more "self-directed" activity, so it will not be possible to accommodate this learning in school systems already strapped for funds; taxpayers don't seem likely to increase their contribution to education with the same willingness as in the past, he noted.

## Practical Solution

A practical solution would be to establish learning centers which would make information available either on-line to terminals located in homes or by letting people borrow software if they

are not directly interfaced, Lewis said.

The learning center may be one solution to keeping up with information because it doubles every 10 years and the number of journals doubles every 15 years.

In order to make the computer available to all who need it, Lewis suggested that those people who have their own systems or terminals be given an incentive to share them.

For example, the learning center could dispense programs without charge on the condition that the home group or business with the computer made it available to individuals for periods of two or three hours a week, the education professor said.

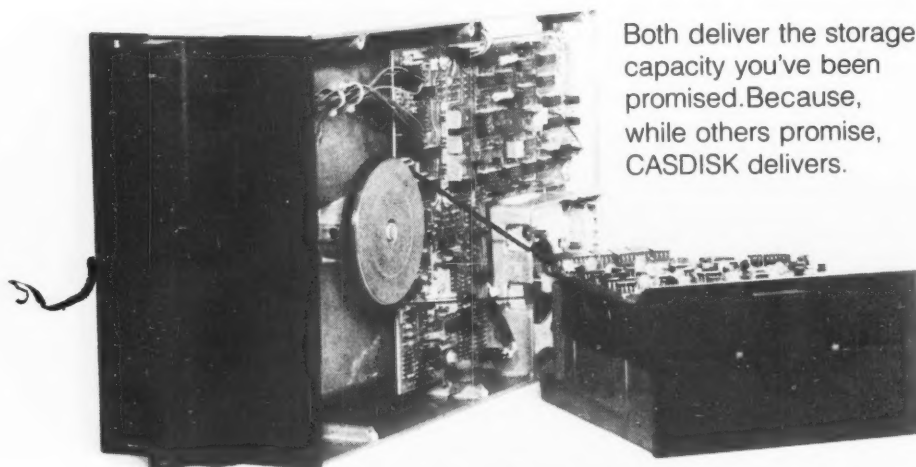
Lewis stressed that although computers and communications networks have improved the ability to access more information, the improvement is not yet a guarantee that everyone who needs the information can get it.

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## Research Net Gets Funding

STANFORD, Calif. — The Research Libraries Group, Inc. (RLG) has received a \$1 million grant from the Andrew W. Mellon Foundation to develop a nationwide cooperative network of research universities, their libraries and independent research libraries.

RLG is a cooperative of research institutions that support joint programs to collect, organize, preserve and provide information required for research, scholarship and instruction.

By setting up a cooperative research network, RLG's goal is to help research organizations coordinate their efforts to make optimal use of finite resources, according to Ed Shaw, RLG president.

Commenting on the state of financial resources for research, Shaw cited studies indicating that the purchasing power of research libraries is dwindling, a trend that is expected to continue into the 1980s.

The Mellon grant brings foundation support for RLG's development program to \$2 million since the beginning of the year. Additional grants totaling \$1 million came from the Carnegie Corp. of New York and the Alfred P. Sloan Foundation.

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## Big Output Tells Times Marathoners See How They Run

Special to CW  
DENVER — Runners in the Denver Marathon here last month were treated to a new source of information during the race. At five-mile intervals, runners' estimated finish times and paces were displayed on a sign in 3.3-in. print.

This was a first, according to Floyd McWilliams, assistant director of the University of Denver's Computing Center.

McWilliams developed the system in response to a request from Dr. Darl Bien, fellow marathoner and race coordinator.

Bien had noted in previous races that the only piece of information given to runners as they traveled the 26.2 miles of their elapsed time.

Of far more importance to most runners is "When will I finish?" or "At what pace am I running?" But how could this be done simply?

McWilliams developed a Cobol program to print projected finish times along with the corresponding pace in minutes and seconds per mile. The times were printed one to a sheet at one minute intervals, starting at two hours 20 minutes continuing through four hours 30 minutes. These were output in print 3.3-in. high, McWilliams said.

In smaller letters, which the runners could not read, the system printed the point along the course at which the times would be displayed — along with the elapsed times — to the nearest second at which each sheet became invalid.

### Synchronized Operation

The information was prepared for each of five way stations along the course. One-hundred and thirty-one sheets were output and burst for each station and bolted through sprocket holes to a standard, which was placed a few years past the indicated distance. A volunteer was assigned to each station to tear off each sheet at the correct moment.

As the runner approached each standard, he could see his projected time and current pace.

The use of this computerized aid in the marathon here was experimental and is, to the best of McWilliams' knowledge, the first such application of computers. Prerace interest in the system was very enthusiastic.

McWilliams can be reached at 4885 E. Arizona, Denver, Colo. 80222.

## Editor at Datapro Named to Chair Next Year's OAC

MONTVALE, N.J. — Amy D. Wohl, executive editor of the Office Systems Group at Datapro Research Corp. of Delran, N.J., has been named chairperson of the Program Committee for the National Computer Conference Office Automation Conference (OAC) to be held next year.

The American Federation of Information Processing Societies (AFIPS), NCC's sponsor, recently announced the creation of the OAC as a separate annual conference. The first OAC is scheduled to be held in Atlanta March 3-5, 1980.

In her position at Datapro, Wohl manages four multivolume technical reference services: "Datapro Reports on Office Systems," "Datapro Reports on Word Processing," "Datapro Reports on Copiers and Duplicators" and "Automated Office Solutions."

She also manages the vendor consulting and contract publishing activities of the Office Systems Group.

More information about the OAC to be held next March can be obtained from Jerry Chiffriller, c/o AFIPS at 210 Summit Ave., Montvale, N.J. 07645.

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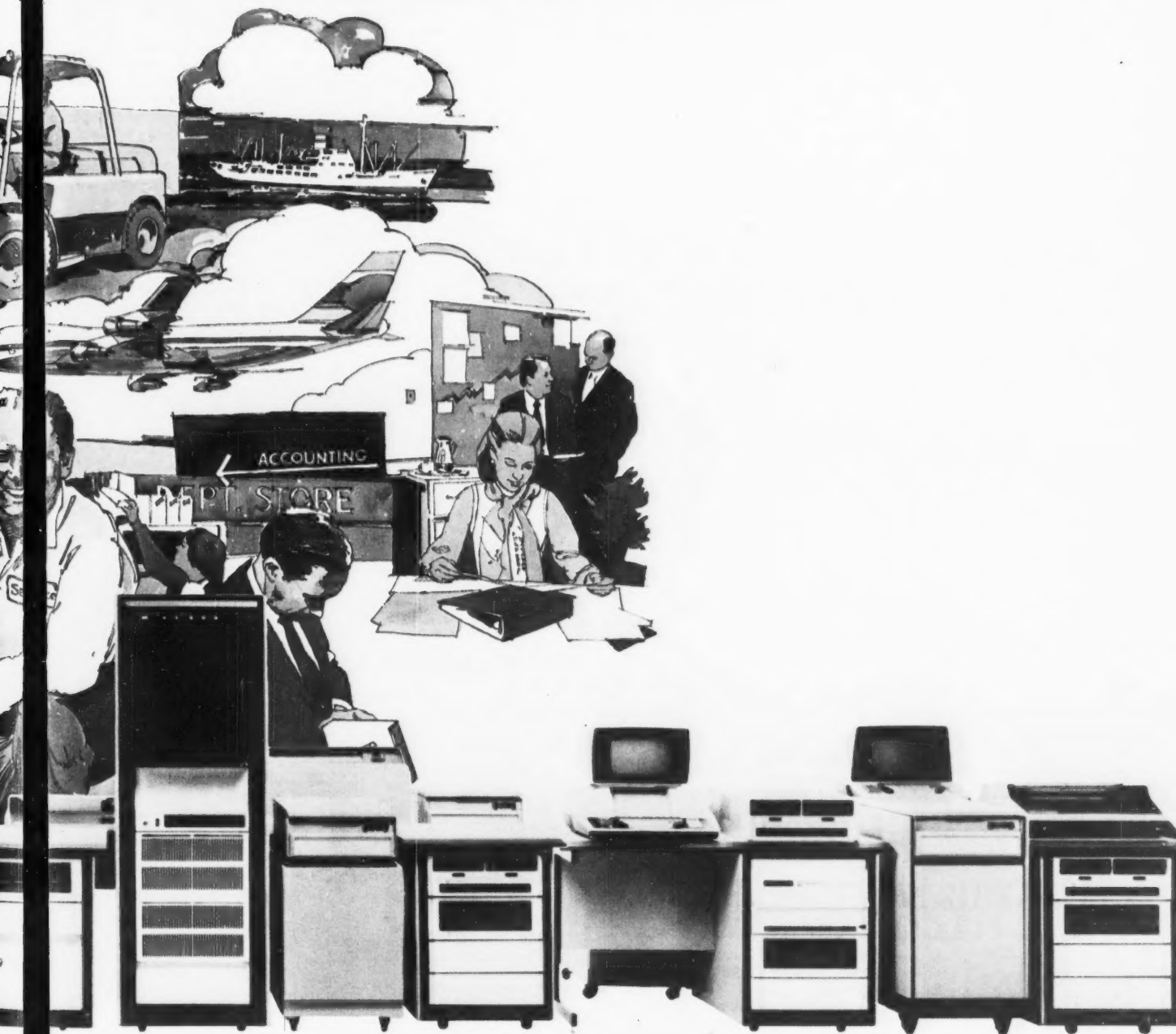
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# System Expedites Phone-In Medical Service

By Tim Scannell

CW Staff

NEW YORK — Computers, telephones and a staff of long-distance doctors are all part of a service here that adds a new twist to the nearly extinct practice of making house calls.

Emergency Med-Phone is a medical consulting service that puts people in touch by telephone with qualified physicians during off-hours, when personal or family doc-

tors might be unavailable.

For a small fee, Med-Phone clients can reportedly call the service at night, on weekends or during holidays and confer with a staff doctor who might prescribe anything from a simple aspirin to hospital emergency room treatment.

"Medicine has changed since our father's or grandfathers' days," according to administrative director Gerald Shapiro, explaining why the ser-

vice — which begins today — is so important. "In a city like New York, it gets increasingly more difficult to get in contact with doctors" who "can't get out or stay at the telephone all day."

## Quick File Access

Although Med-Phone's operation revolves around the telephone, linking patient with doctor, the success of the service itself depends upon

the accuracy and availability of each person's medical history file. When a client signs up for the service, Med-Phone sends him a three-page medical questionnaire covering everything from allergies and minor back problems to serious bodily disorders.

After the patient answers all of the questions and sends back the form to the dial-up medical consultant, the form is forwarded to Astradyne

Computer Services, Inc., a service bureau located in Garden City, N.J. There, the clients' medical histories are compiled and condensed into a single book that is cross-indexed by enrollment number and date of birth.

When a patient calls the service requesting medical advice, the staff doctor can flip through the computer-generated listing, find the client's records and prescribe personal interim treatment.

Astradyne's NCR Corp. 8200 system updates the client medical listings about every week or 10 days. In addition to keeping a record of every patient's phone calls, the service bureau also keeps track of any written physician reports or medical notations that might evolve from any telephone sessions.

Astradyne also handles the medical consultant's administrative duties, including billing for each call and subscription renewals.

Although Med-Phone presently functions entirely in batch mode, future plans include switching to an on-line operation as the number of subscribers increases.

## Natural Evolution

While a public-access medical service such as Med-Phone may sound like a unique idea, the concept actually evolved from a similar service offered to health insurance subscribers some 10 to 15 years ago.

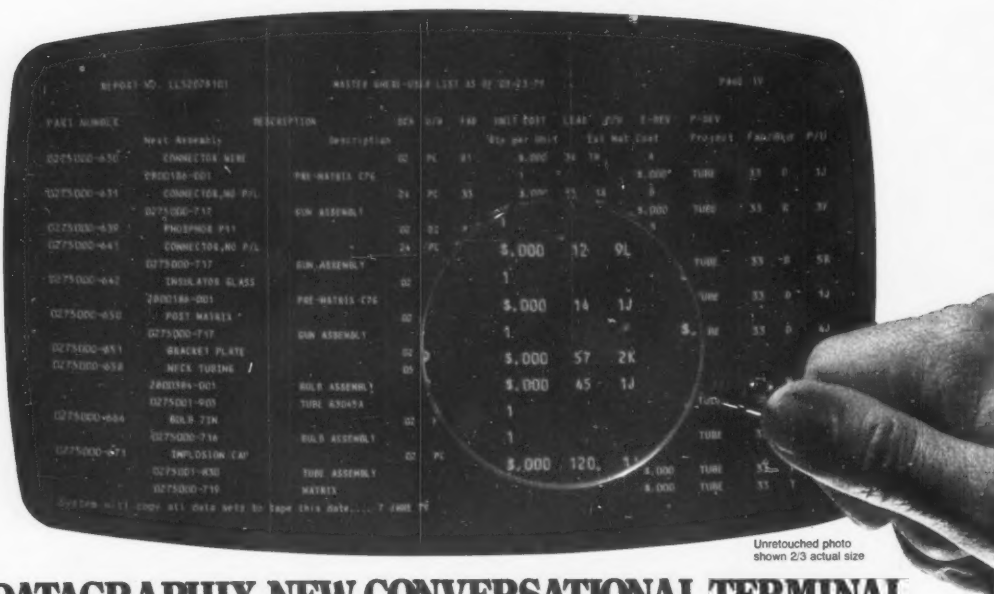
Insured patients would call the service, called the Emergency Medical System, during off-hours and be referred to a particular doctor or treatment center.

Dr. Norman Cherniak was director of Emergency Medical System and realized that a similar service could be extended to the general public. "About 70% of the [Emergency Medical System] calls after hours didn't require sending people to a doctor or to an emergency room," Shapiro pointed out.

In fact, "studies and statistics indicated that about two-thirds of the people who came to emergency rooms didn't have to come. They could have been handled with advice from the doctor, but there was no way to get hold of one."

Currently, Med-Phone employs 21 doctors to answer the emergency telephone, as well as a number of nurses and medical administrators who record pertinent information. In addition to dispensing medical advice, Med-Phone staff can call ahead and ready a hospital emergency room for a patient's arrival, recommend an all-night pharmacy or try to locate a client's regular doctor.

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# Photos Coded by Mini, Digitizer Lose a Diamond? Gemprint Could Help Find It

By Cheryl Morrison

Special to CW

A computerized process for identifying diamonds is on its way to becoming the gem owner's best friend.

The process, called Gemprint, was developed by Israel's Weizmann Institute of Science, where scientists discovered that each diamond emits a distinctive pattern of reflections when a weak laser beam is directed through it. The patterns identify diamonds with even more certainty than fingerprints identify people, officials at Gemprint, Ltd. claimed.

The Federal Bureau of Investigation, five city police departments and about 250 jewelers throughout the U.S. have obtained Gemprint machines that record the patterns on film. Gemprint, Ltd. keeps a central registry of the photographs in Chicago.

Police can use the photographs to identify lost or stolen diamonds that have been recovered, and Gemprints also can deter fraud against insurance companies, jewelers and private owners.

## Diamond Check

Gemprint, Ltd. started operation in 1975, and for more than three years its registration photos were coded manually. But in April the company began using a Digital Equipment Corp. PDP-11/03 minicomputer with a Colorado Video 270A digitizer.

The digitizer employs a television camera that records the light pattern and converts it into numbers, which then are fed into the computer. Other data such as the customer's name, the stone's weight and the insurer's name are keyed into the computer as well.

When a registered diamond is reported lost or stolen, the computer repositions its data on the gem into a file that is checked against all new registrations and all inquiries from law enforcement agencies.

Gemprint officials are encouraging police to make prints of all diamonds they recover so the prints can be checked against the registry's lost-and-stolen file. The registry now includes records on about 25,000 diamonds.

The Dallas, Miami, Denver, Chicago and Los Angeles police departments have obtained Gemprint machines.

Jewelers who are equipped to make the registration prints usually offer them at no extra charge to customers who buy diamonds from them, and they'll register diamonds purchased elsewhere for about \$20, according to Gemprint General Manager Craig S. Carnevale. The machinery costs the jewelers about \$3,000.

Owners who register their diamonds are given a numbered registration certificate and a 4-by-5-in. photograph of their gem's light pattern (which resembles a constellation in a dark sky). They also receive a notice-of-loss form to send to the registry if needed.

About 360 insurance companies are offering 10% discounts on insurance premiums for diamonds that have been registered with Gemprint, Carnevale said.

## Gem: Lost, Found

To illustrate how the registration process protects insurance companies, Carnevale told of an Indiana jeweler

who had registered a diamond that a mother and father bought for their son's high school graduation ring. A few months later, when the son told the parents he'd lost the ring, they sent the loss notification card to Gemprint.

The registry notified the jeweler, which is routine. When the son later went to the same jeweler with a diamond to be mounted into an engagement ring, the jeweler made a print of it.

The print showed it to be the same diamond the youth had claimed was lost. The jeweler notified the insurance company, which was saved from a \$1,500 false claim, Carnevale said.

These prints can also protect jewelers

from customers who accuse them of switching gems in jewelry that's been cleaned or remounted, he noted.

## Real or Not?

The process enables the jeweler to determine immediately if a gem is a genuine diamond. While it is often difficult to tell a real diamond from a simulated one with the naked eye, the light pattern emitted by a simulated diamond is quite different from that of a real one.

A print can be taken from a diamond whether it's mounted or loose, and the diamond emits the same light pattern every time the beam is directed through it. This way, diamonds can be

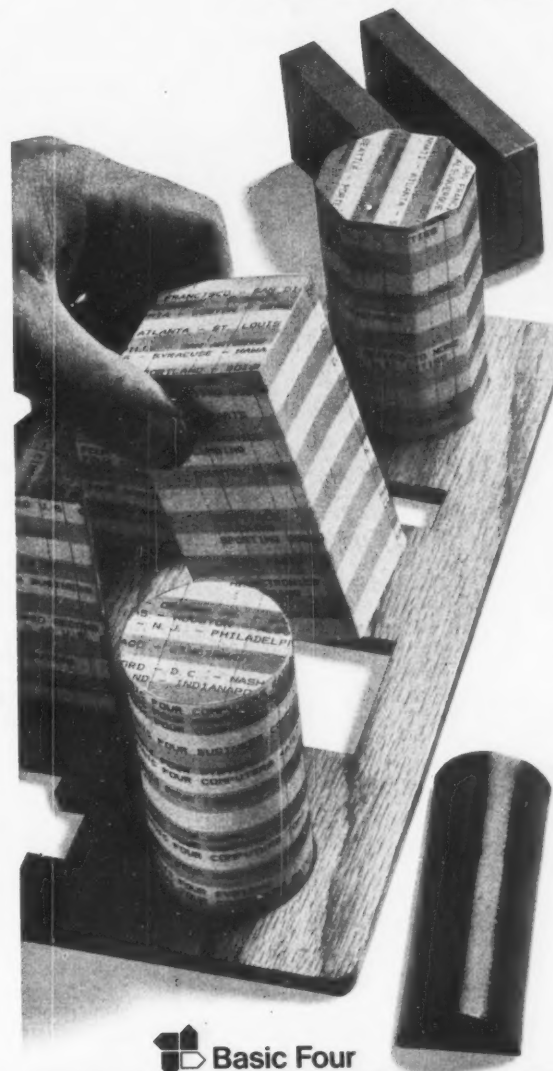
traced even if they've been remounted, which was nearly impossible before the process was developed.

If a diamond is cut, the resulting stones will emit different light patterns than the original and can't be matched up with the Gemprint of the original. But if a diamond is merely chipped or slightly damaged, its print is still recognizable, Carnevale pointed out.

The only time anyone has attempted to use a Gemprint as evidence in court was in a 1977 case in Texas, and the judge declared the print admissible as evidence.

Morrison is a free-lance writer.

# It took Basic Four to fit distributed data processing to our business



Our company now has outlets in seven cities. And each was screaming for its own computer!

Management approved. It makes sense to have tools where you do the work—as long as we could retain central control. We looked into it, and chose a network of Basic Four® computers.

Basic Four calls their network "Distributed Business Systems," because the emphasis is on business solutions, not just fancy hardware. And that's what our remote locations need.

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So there were tested software applications available to us. Plus the right size computer for each of our locations. And concurrent multi-function options, like forms entry and integrated word processing.

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Distributed processing has to fit the job. And the best fit for our job was Basic Four.

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# Micros to Sharpen Operation of Oldest Sawmill

By Robert L. Glass

Special to CW

PORT GAMBLE, Wash. — This picturesque Puget Sound community is a piece of living nostalgia, a national historical landmark straight out of the Victorian 19th century.

It is also about to become the focus for the latest advance in computerized sawmill technology.

Pope and Talbot, the forest products company that owns the sawmill which is Port Gamble's only industry, has just begun a \$12 million expansion of the mill. When phase one of the expansion is

complete, the mill — the oldest continuously operating sawmill in North America — will have a computerized headrig and edgers.

The goal of the expansion is to maximize the harvest of lumber, the price of which has gone up "savagely" in recent years, according to William A. Whelan, Pope and Talbot executive vice-president and chief operating officer. Computerization is expected to minimize log wastage by increasing accuracy. According to Whelan, labor is no longer the key factor in sawmill profitability — raw resources are.

The computers involved in the modernization are special-purpose dedicated microprocessors, according to Willis Gill of Pope and Talbot's Portland, Ore. office, where computerization is controlled. One MPU, made by North American Control of Portland, is based on Digital Equipment Corp. LSI-11 technology. The other is made by Saab Totem and is based on a Swedish design.

Assembly language software is loaded into the micros on floppy disks. A special environmentally controlled room protects the unattended micros from vibration, salt air and temperature extremes.

The computerization of sawmill activities was pioneered by Pope and Talbot in 1973, according to Gill. Early micros ran successfully despite the dust and hot temperatures.

The Port Gamble computer-

ization breaks some new ground, Gill said. The computer controls the task of sawing a log into the maximum number of variously sized boards — 2 by 4s, 2 by 6s and so on.

Both the edging of the log and the center cant cuts will be analyzed by an infrared scanner, which inputs to the computer the data necessary for the computer to decide in real-time how and where to cut the log.

The system is expected to be faster, more versatile and more efficient. The operator of the edger and center cant cutter

need only input the grade of the log, if it is unusual, and push "start."

The computer controls log movement, scanning and cutting.

The work force of more than 300 people here will probably increase by about 20% as a result of the expansion.

For Port Gamble, restored to resemble the 19th century New England hometown of corporate founders A.J. Pope and W.C. Talbot, the change has been a major one. What will happen when nostalgia and computerization collide remains to be seen.

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## Guide Discusses Computer Crime, Security Program

NEW YORK — A publication explaining why the computer is vulnerable to foul play and how companies can protect their profits and assets is available from Amacom, the publishing division of the American Management Association (AMA).

Written by Charles Hemphill Jr. and Robert Hemphill, the publication explores the various ways computer hardware and software can be protected from theft and damage.

The guide costs \$5 for AMA members and \$7.50 for non members from the AMA, 135 W. 50th St., New York, N.Y. 10020.

## NCIC Records Top 7 Million

WASHINGTON — The National Crime Information Center (NCIC) maintained 7,068,167 active records as of April 1, according to the organization's newsletter.

The breakdown was as follows: 148,878 wanted persons; 21,226 missing persons; 934,896 stolen vehicles and stolen vehicle parts; 1,333,297 stolen and recovered guns; other stolen property consisting of 987,009 articles, 16,494 boats, 355,207 license plates; and 1,840,741 securities; and 1,430,418 criminal histories.

In March, NCIC network transactions totaled 8,972,020, averaging 289,420 daily, the newsletter said. The NCIC host computer operated 714.4 hours or 96% of the 744 hours in the month.

Scheduled downtime totaled 1.4 hours, or .2%; unscheduled downtime totaled 28.2 hours, or 3.8%.

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## Managers on the Move

MARIA DREY has joined Aloha Airlines as director of data processing in Honolulu.

Drey was most recently a marketing research administrator for Hawaiian Telephone Co. Prior to that, she was a data communications consultant for the company and also served as a marketing representative for IBM.

Drey is a graduate of California State University at Long Beach and holds an M.B.A. from the University of Hawaii.

...

DENNIS MUENZER has been named vice-president of planning and administration of Ideal Toy Corp. in Hollis, N.Y.

Muenzer joined Ideal in 1971 and has served as the director of management information systems and as an assistant to the president. Previously, he was director of management information services for the BVD Division of Rapid America Corp. and manager of manufacturing systems for Schering Corp.

Muenzer received a B.S. degree in finance and an M.B.A. in management from New York University.

...

CLARK S. BRADLEY has been appointed director of management information systems at Union Tank Car Co. in Chicago. Bradley will be responsible for the company's systems and data-processing activities, including computer services and systems development.

Prior to joining Union Tank Car Co., Bradley served as DP manager for the Richardson Co. in Melrose Park, Ill., as systems manager for Electronic Data Systems of Chicago, as unit controller for Whittaker Metals and most recently as manager of information systems development and programming for the Chicago Bridge & Iron Co. in Oak Brook, Ill.

He received a bachelor's degree in business administration from Culver-Stockton College in Canton, Mo.

...

SEIGLE C. HAYES has been appointed senior systems analyst at Varco-Pruden Metal Buildings Systems in Memphis.

Prior to joining Varco-Pruden, he served as project manager for Melinkrodt, Inc. in St. Louis. He also served as project supervisor for Miles Laboratory in Columbus, Ohio, where he was responsible for the company's DP operations.

Hayes holds a bachelor's degree in business administration from Southern Illinois University.

...

ROY FARRIS has joined Commercial Metals Co. in Dallas as director of management information systems.

Farris has 18 years of experience in data processing. He was previously employed at Atlantic Richfield Co.

Farris has a B.S. in mathematics and engineering from the University of Texas at Arlington and a master of liberal arts from Southern Methodist University.

...

JAMES MATTEONI has been named U.S. group vice-president of Levi Strauss & Co. in San Francisco. He continues as the group's director of

management services, responsible for telecommunications, data processing and systems and programming, a position he has held since May 1977.

Matteoni joined Levi Strauss in 1975 as director of management information services for the company's international group. He was previously manager of international data processing for Abbott Laboratories.

...

SKIP BARKIS has joined Two Pi Corp. as its computer center manager in Santa Clara, Calif.

He came to Two Pi from the Computer Usage Co. in Sunnyvale, Calif., where he was a systems consultant.

Barkis holds a B.S. degree in mathematics from California Polytechnic



Hayes



Bradley



Drey



Muenzer

State University in San Luis Obispo, Calif.

...

ROBERT P. OREN JR. has been appointed assistant vice-president of

data processing for Danners, Inc. in Indianapolis.

Oren was previously vice-president and director of data processing for the Park National Bank in Knoxville, Tenn.

## I thought Gandalf was the short haul modem user's choice. Until I discovered Prentice!



Now I save money because I need fewer spares.

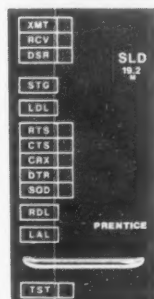
Any Prentice modem plugs into any slot. So one spare works at both ends of my circuit. With Gandalf I needed two. Plus, Prentice modems are far smaller than Gandalf's, so they take up less space.

I lessened system downtime because I install and replace modems quicker.

Installing a Gandalf modem takes a lot of screwdriver work at the rear of the unit. My Prentice modems simply plug in. I needed an oscilloscope to equalize Gandalf modems. I don't have to equalize Prentice modems at all. And I can replace

Prentice modems with power on which means I can service one line without shutting down other lines. With Gandalf, when one modem comes out, the whole cabinet goes off.

My maintenance costs dropped because I have better diagnostics.



Gandalf's diagnostics isolate only a modem malfunction. Prentice diagnostics evaluate my telephone line and terminal, too.

My Choice? It's Prentice now.

Gandalf modems transmit data, but that's all. Prentice does so much more to keep my system running that there's no other choice for me. Give them a call at (415) 494-7225 or write to them at 795 San Antonio Road, Palo Alto, California. 94303. I think they'll be your choice, too.

# PRENTICE



## Calendar

June 27-30, Hollywood, Fla. — International Association of Hospitality Accountants, Inc. Annual Computer Conference. Contact: Sal V. Spano, Diplomat Resort and Country Club, 3515 S. Ocean Drive, Hollywood, Fla. 33020.

July 9-10, Seattle — Records Retention and File Management Seminar. Contact: Thomas Wilds Associates, Inc., 50 E. 41 St., New York, N.Y. 10017.

July 9-10, New York — Minicomputers and Small Business Computers: Selection and Usage Guidelines. Contact: Datapro Research Corp., 1805 Underwood

Blvd., Delran, N.J. 08075. Also being held July 23-24 in San Francisco.

July 9-11, San Francisco — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 18-20 in Washington, D.C., and July 23-25 in Detroit.

July 9-11, San Francisco — Word Processing: Guidelines for Planning, Design and Implementation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in Chicago.

July 9-11, Chicago — Computer Performance Measurement: Tools and Techniques for Increased System Productivity. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in New York.

July 9-11, New York — Data Processing: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in San Francisco.

July 9-11, Los Angeles — Data Base Management Systems for Minis: A Comparative Analysis. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 23-25 in Washington, D.C.

July 9-11, Washington, D.C. — Distributed Systems: Are They Right for You? Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in Los Angeles.

July 9-11, San Francisco — Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in New York.

July 9-11, Los Angeles — DP Operations Today: Effective Scheduling and Console Operation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 9-11, New York — Women in Management: Building Job and Life Management Skills. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

July 9-20, Santa Cruz, Calif. — Advanced Course on Computing Systems Reliability. Contact: Joleen Kelsey, University of California Extension, Santa Cruz, Calif. 95064.

July 11-13, Chicago — Fundamentals of Finance and Accounting for Nonfinancial Executives. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held July 16-18 in Minneapolis, July 16-18 in New York

and July 16-18 in Los Angeles.

July 11-13, San Francisco — Data Base Management Systems: General Concepts and Planning Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in New York.

July 11-13, New York — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in San Francisco.

July 11-13, Los Angeles — Integration and Word Processing and DP Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 18-20 in Washington, D.C., and July 23-25 in Detroit.

July 11-13, New York — Ef-

fective Computer Operations Management. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 11-13, San Francisco — DP Project Management: A Practical Approach. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 23-25 in New York.

July 12-13, Houston — Data Communications: Advanced Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held July 16-18 in Denver and July 23-24 in Washington, D.C.

July 12-13, Boston — Cobol Programming Workshop for Auditors and Accountants. Contact: The Foundation for Continuing Education, 15 School St., Boston, Mass. 02108.

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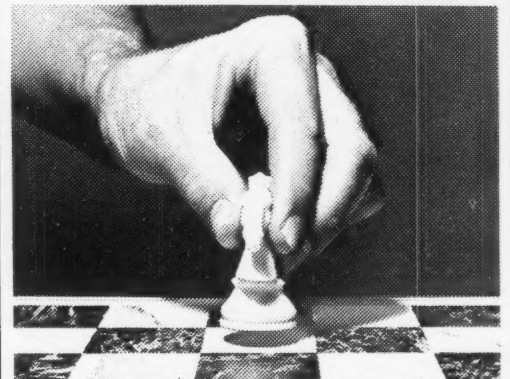
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The CW Calendar generally appears in the first and second issues of each month; events are listed a month in advance.

All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

Because of space constraints, regional conferences cannot be listed.

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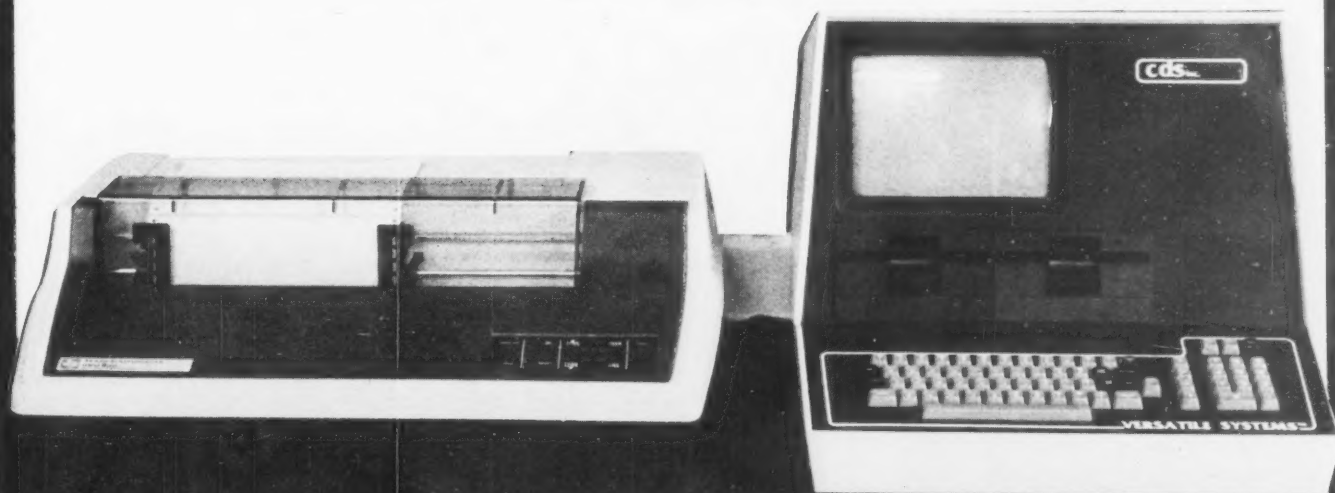
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*Harry Wolford, Director of Computer Services and Statistical Reports, Ohio State Department of Education, Columbus, Ohio.*

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*H. B. Taylor, Director, Houston Computer Center, Allied Chemical Corporation, Houston, Texas.*





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*Dr. Paul Whalen, President, Interactive Computing of Vermont, South Burlington, Vermont.*

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## EDITORIAL

### Kudos to Codasyl

The people who make up the standing committees of the Conference on Data Systems Languages (Codasyl), from Executive Committee Chairman Jack Jones on down, deserve a great deal of credit — and thanks — for what they have accomplished. And support in what they hope to do from now on.

The group recently celebrated the 20th anniversary of its "birth" with discussions of what goals it should have for the next decade (see Page 61). That's pretty impressive, considering the skeptics who expected the original study group to accomplish nothing in its allotted three-month life span.

The skepticism seemed justified then. Codasyl, the organization, grew out of a conference convened by the Pentagon in late May 1959. Its purpose was to determine if a single programming language could be developed to handle business applications on a number of different computers. Was program portability possible? That was the question.

To put that question in perspective, it's worth noting that Fortran was only two years old in the spring of 1959 and still a long way from the haven't-we-always-had-it? of the engineers. On the hardware side, IBM was still six months away from announcing the 1401.

Today the Common Business-Oriented Language — yes, Cobol — that evolved from Codasyl's first mission is almost taken for granted. Plaints — possibly justified — that Cobol is too wordy are far more numerous than plaudits that the language works.

But having developed Cobol (work that continues to this day), Codasyl expanded its scope of interests 10 years ago. Task groups and now formal committees have been trying to provide some order to data base management, to better end-user facilities and to the possibility of a common operating system control language.

Codasyl is a development organization and that's important to all of us, whether we work with the committees or just reap the benefits of their efforts. Participants are genuinely interested in finding new ways to make the world of DP simpler. That is quite different from the equally significant but far more static work of the American National Standards Institute.

Working on a Codasyl committee takes time, effort and money. Almost all of the committees are below their 25-member limit and the chairmen would welcome volunteers to join them. The groups are made up of both users and implementors, in careful balance.

If you and your organization are interested in volunteering, we urge you to contact Codasyl through P.O. Box 1808, Washington, D.C. 20013.

## DATA PAST

### Five Years Ago June 5, 1974

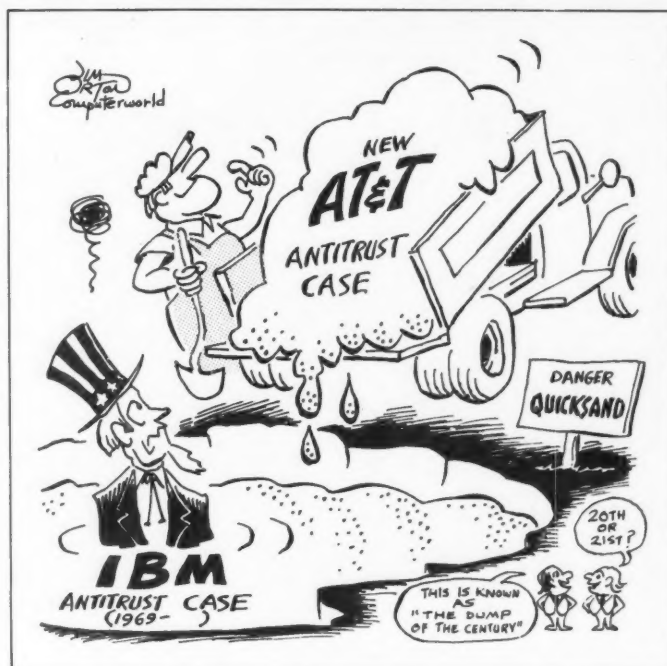
HARTFORD, Conn. — Since DP users have come to depend increasingly on on-line systems for integral business functions, the danger they face from power outages or brownouts became even more significant, panelists at a power supply symposium here agreed.

NEW YORK — Under an 11-year contract signed between *The New York Times*, the *Daily News* and the New York Typographical Union No. 6, the papers would be allowed to fully

automate their printing operations, but would have to guarantee jobs to all union members for their lifetimes.

### Eight Years Ago June 9, 1971

MIAMI — Eastern Airlines tried to win a tax rebate by proving in court that IBM's software and support before unbundling were actually worth 55% of the catalog price of its system. The airline challenged the 1970 plant equipment valuation of its computers, saying about half the figure was embodied in software, education and other support and as such was not "tangible" — taxable — property.



## LETTERS

### Idea for Codasyl

A May 14 *Computerworld* article announced the then upcoming meeting of the Conference on Data Systems Languages (Codasyl) which, among other things, was going to discuss data base directions. It reminded me of an idea that occurred to me a year ago and I would like to share.

It seems to me that the most important aspect of a data base-oriented application system is the integrity of the logical data base structure. If the logical data base design accurately reflects the organization's true data relationships, then other problems, such as poor applications software, can be overcome more easily than if the reverse were true. On the other hand, it is extremely difficult to make up for a poor logical data base structure by better programming.

The probability of a poor design is not reduced by the use of a better data base management system (DBMS), although the impact may be lessened. In addition, it seems like a waste of time for organizations to reinvent the wheel when it comes to developing a data base model. I would like to offer a three-step plan for making progress in this area.

First, Codasyl should develop a common language and illustration technique for representing logical data base models.

Second, Codasyl should sponsor a contest each year for the best data base model by organizational category — banking, education and so forth.

Third, the award-winning designs should be combined and published.

The collection of designs could become a standard reference book of generic data base models for refinement by a data base analyst. The designs would evolve as new and better designs were submitted. We would avoid costly reinvention of the wheel and contribute to an increase in product quality and development productivity which are sorely needed.

Finally, DBMS developers could use the collection of designs as one barometer in their decisions on how to improve their products.

Michael L. Rice

Arlington, Va.

Codasyl has, in fact, devised a data base management system architecture, largely to clarify areas of responsibility of its own committees, several of which are working on data base-related topics. We'd suggest reader Rice — and anyone else interested — contact the chairman of Codasyl's Data Description Language Committee, M.L. O'Connell at Digital Equipment Corp., 12 Crosby Drive, Bedford, Mass. 01730. Ed.

### It's Up to Individual

Jack Stone's Human Connection column "Management Should Attend to Employee Development" [CW, May 21] illustrated an all too common fallacy in professional development. A dismayed employee spoke thus of his former employer: "Are these the people into whose hands I want to place my professional career?"

At best, an organization can only create a climate for professional growth. No career should be considered successful if the ingredients of individual initiative and demonstrated self-development are lacking. The specific words quoted in the article belie an employee attitude revealing the true plight of an external dependency for one's career growth — "I became desperate," "had to settle," "abandoned." He who puts his career into hands other than his own deserves what he gets!

Peter Kushkowski

Haddam, Conn.

*Computerworld* welcomes comments from its readers. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.



## READER COMMENTARY/Thomas Zillner

# Operator's Job Can Be Creative, Satisfying

Computer operations is a backwater in many companies. Although there has been some disagreement whether programmers should be considered "professionals," no one has seriously asserted that status for operators.

Operators are frequently viewed as semiskilled clerks, performing intellectually undemanding tasks. This is often true but does not have to be the case. Operators can function as valuable members of the DP staff, as creatively important as programming and systems personnel.

The problem with operations is essentially one of job satisfaction. Operating most of today's computing systems is boring and rarely offers enough challenge to attract and retain fully qualified people. Many of the smaller systems marketed today em-

phasize ease of operation to the point that operations is reduced to a clerical task. Even medium- and large-scale systems offer operators very little pride or sense of accomplishment because the jobs are usually repetitive.

Management strategy has traditionally been to offer the lure of programming as a step up the ladder from operations. Recruits fresh from programming schools are started in operations with the promise of a chance at programming in the future. In many worst-case situations, the most intelligent and strongly motivated operators fight their way into programming leaving operations to less imaginative individuals.

What is the solution to this continuing problem? Operations must offer the same types of rewards as program-

ming to discourage the migration into programming. Operators should be assigned responsibility for maintaining JCL, writing sort parameters, writing systems and utility software and preparing and updating documentation. This requires close coordination between the programming and operations staffs and implies a mutual respect that is often lacking.

Operations staff should routinely become involved with system design projects at the beginning. Too many projects have been completed only to have a sophisticated system defeated by its "inoperability." Console messages may be ambiguous or misleading, run directions may be rudimentary or nonexistent and rerun information may not be available, to mention a few common problems. Involvement

of operators at early stages in system development may alleviate these situations before they cause trouble.

Small installations using new user-friendly systems should upgrade clerical personnel to computer operator positions, rather than use a skilled operator to run a system that assumes no technical skill.

Operators themselves need to make their colleagues and managers aware of their capabilities. As an operator in small- to medium-size shops, I have found it taken for granted by many programmers and some managers that operators are not as capable as programmers and therefore cannot be trusted with complex projects.

It is up to the operation to win the confidence of skeptical programmers and DP managers. I have found a few techniques helpful:

- Familiarize yourself thoroughly with what the programs you run are actually doing, not just the volumes to be mounted and the operator messages.

- Volunteer to take over or assist in operations documentation. Everyone seems to hate preparation of documentation, and for this very reason, it is a means for the operator to gain respect for his capabilities and achieve some job satisfaction. This task makes the abilities of an operator highly visible to DP management, since he or she will work closely with the programming staff to prepare and verify run documentation.

- Join local and national professional

(Continued on Page 56)

## HUMAN CONNECTION/Jack Stone

## 'Cronyism' Drives Out DPer

"Cronyism" was what one systems programmer recently told me had caused him to leave DP and transfer into his company's marketing department. He told this story:

"We have one of the finest collections of technical talent around. We've got some mighty potent machinery installed and we had it jumping through hoops.

"We also had plenty of tight schedules and some very tough applications, but we were always able to get the job done. One major reason was our attitude.

"I, for one, took on each new job as a challenge. I greeted specs for advanced systems with considerable excitement. I eagerly sought projects involving terminals with more processing function, higher reliability targets, new software extensions and, of course, the newest technology.

"There are many advantages to working in our DP operation. Generally, we are not hassled when we are involved in difficult development projects, and we have plenty of terminals for on-line debugging. We have lots of support from administrative services which, literally, cater to our every whim. We have plenty of junior people to offload the peanut chores. We have excellent working conditions, gobs of training opportunities, good salaries, the works.

"Because of these factors, I felt as though I were working in a programmer's heaven, until I began to put some pieces together and finally figured out that promotions and salary increases were being handed out to the buddies of the DP manager.

"Oh, I guess our department is forward-looking as compared with most DP operations in that we have 'management by objectives' programs and 'personnel appraisal' programs and everything else the industrial psychologists have determined are important to motivate the DPer. Believe me, I'm not a chronic complainer, but all of these things fade into the background when you find out that the boss is handing out top jobs based on friend-

ship, not performance."

Well, since the programmer declined to discuss the evidence that justified his charge, I'm not sure it has merit. But I do know that a very competent programmer asked for a transfer and a change of career because one particular condition, in what otherwise was a stellar operation, was intolerable to him.

## Emotional 'Cancer'

Cronyism is serious enough, but the point I want to make is much broader than this particular issue. It is well known that, in a computer center, many DPers get all worked up over one human situation or another, which may be real or imagined — a tendency which, for once, is not necessarily restricted to the DP mentality. The feelings begin at a benign stage and gradually move through a chronic era into a sort of festering emotional cancer.

To illustrate how an employee reasons through this kind of problem, let me synthesize a general pattern that may well occur. Think the employee: "I see here a situation that is terribly negative and detrimental to good employee relations. It is completely obvious to me and everyone else as well, so the DP manager must be aware of it. But he is doing nothing about correcting it.

"I have to conclude, therefore, that the manager is too busy to act or too insensitive to the issue or too uncaring about his people. Regardless of which explanation is correct, the fact that the situation has persisted so long without resolution is intolerable to me. So I must depart because this DP manager is not the kind I want to be working for."

It's not difficult for you, the DP manager, to structure a plan of action for uncovering and resolving serious difficulties in the personnel arena. The plan involves all the familiar elements of the research study process: gathering data through interviews, meetings and private conferences; analyzing data for commonalities and identifying problem areas; setting priorities for at-

tacking the problems; working with employees to select the best solution among alternatives; communicating the solution to the employees; and following up later to ensure the effectiveness of the solution.

But what is difficult is facing up to the fact that you may be the core of the problem and admitting it.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20022.

## READER COMMENTARY/David West

## Modus Operandi Key to Successful MIS

Management information systems (MIS) have been around and working well for hundreds of years. Caesar and Charlemagne had them. The shoguns of Japan and the ancient kings of Egypt each had one. If we are to build modern computerized versions, we must understand how these early systems work and why.

First, a definition of management: the policymakers; the executive officers and board of directors of the organization. Divisional directors and heads of large departments can be included.

Two things can be said about these people: They are all different (and that is very important as we shall see later), and they are action-rather than procedure-oriented. They work through people contacts gathering "soft" data from phone calls, meetings and person-to-person visits.

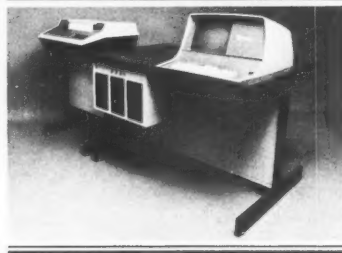
In addition, managers spend as much time with other managers — gathering data from outside their immediate area — as they do with their subordinates, monitoring activities within their own jurisdiction.

This "soft" data, which deals as much with the future as with the present, is then "processed" by the manager's subconscious mind. He reaches conclusions (when conclusions are called for) without the aid of a conscious, formal data analysis system. He is not particularly aware of the data reduction process, does not have a solid understanding of how it works but is clearly proud of his "secret system" and of its results.

Some key points can be noted in this description. One is that much of the data and most of the pending decisions deal with the future. The data is "soft" because the topics it concerns are still speculative and therefore not exact. This does not blend well with the rows-and-

(Continued on Page 58)

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## SOCIOLOGY OF COMPUTING/Robert L. Glass

# Women vs. Chauvinism: A DP Showdown

Liberated women, even in the fairly open computing field, still run into a lot of chauvinism, both institutional and individual. That, in turn, leads to some pretty enormous frustration.

Some liberated women aren't able to do much more than sit on those frustrations. But others find a way to make at least a dent in long-solidified, chauvinist stereotypes. This is a story about one of those women.

Marlene Fleiss, a normally mild-mannered, Clarkes-Kent kind of programmer, finally got fed up with the lack of female recognition in most of our professional literature. What is more, she did something about it.

Let us regress a few person-months. Marlene's debut into the world of Clinker, Stoker and Soot Energy Co. (CSSEC) wasn't exactly a door-buster. What I mean is, you know how some computing jobs are just plain D-U-L-L? The kind of dead-ender that nobody wants to do, but somebody has to? Like configuration management of a large system, or payroll maintenance with its middle-of-the-night phone calls, or documentation flow charting and its art-for-posterity's-sake graphics?

Well, Marlene got one of those jobs. She reviewed programmer error reports, categorized the errors (Was it a design error? A logic error? A data base error? That sort of thing), did some statistical analysis on the results and wrote a report.

Considering that there were 2,000 error reports (yep, 2,000 of them!) to be analyzed, you can imagine how much fun her job was.

### Why Bother?

You might be asking, "Why bother? Who would care enough to pay for analyzing programmer errors?" The answer is somewhat obvious, if you think about it. The U.S. government cared. It was gathering data on programmer errors and their cause. Like, if you know that errors of category Y tend to originate from act X, maybe you can eliminate or modify X.

A nice idea, maybe. But a boring job, getting the data.

Be that as it may, Marlene sank her bicuspid solidly into the task and began categorizing up a storm. In a company where programmer performance is measured by the metersticks of cost and schedule, Marlene was a reassuringly on-target performer.

But the inevitable boredom was mounting. Most programmers, I have found, like to program. That's sort of what the field is all about. And that's where the sense of accomplishment comes from.

Marlene's job had all the allure of pumping gas. Oh, sure, technical judgment was required in category selection and in statistical analysis and in the writing of the report. But, to be truthful, not much. And the end result was not something you could stand back, size up and be proud of.

It occurred to Marlene that her gender may have been involved in her selection to do the job. It was largely a clerical function.

To all outward appearances, the task

was going along swimmingly. It was when Marlene began her report that all the frustration and all the anger spilled out.

It is a keystone of the computing profession that logic dictates decision making. True to both her own nature and her craft, Marlene slowly evolved a plan to channel her anger into a purposeful protest act.

As she wrote that report, every personal pronoun she inserted was feminine. None of that "the programmer spent three man-hours correcting his error" stuff. Instead, she wrote "three person-hours" and "her error." It was "her desk," "corrected the error herself," "she wrote the program in Fortran."

She did it all tastefully. The opportunities for personal pronouns in the report were few, and Marlene didn't force things. Sprinkled gently through at a rate of two or three per page, it was hardly a blatant protest. But the message was clear.

And it was a fascinating message. Each feminine pronoun jarred the reader like an obscene word. It was not possible to read that report without reacting.

For a normally sensitive person, a question began formulating: "If the female pronoun is this striking in context and the male pronoun is not, then look how solidly we have been conditioned over the years to accept male domination in the pronoun world... and elsewhere."

Of course, Marlene's report presented a challenge to management. It's the era of ERA, right? So what would you do if it were your responsibility to buy off Marlene's report?

### Path of Least Resistance

CSSEC management chose the path of least resistance. When it came time to review the report, they passed it through without a comment. Not one "her" or "she" was touched. And Marlene, who was beginning to form a psychological attachment to the success of her protest, was elated.

Off went the report to the government agency. Only one hurdle remained before it would be formally issued and available universally as a government document. The suspense hung like slow turnaround in the CSSEC air.

It didn't last long. Back came the report, with marginal government critique. Each pronoun was carefully asterisked. And at the very end, as the explanation for the asterisk, was the following footnote:

"A tech report submitted to the government is no forum for a women's liber. Please use third person throughout, regardless of whether all programmers were women."

Marlene's disappointment was tempered by one perverse pleasure. She had managed to flush out one more unknowing Male Chauvinist — one who appears to believe, without even thinking about it, that "third person" means "masculine."

But the report, I am sorry to say, was issued with an all-male cast of personal pronouns.



## THE TAYLOR REPORT/Alan Taylor

## Public Terminal Failure May Turn to Success

Recent articles have described the failure of one of the most advanced sets of public terminals for accessing data bases, that of West Publishing Co.'s Westlaw system.

Since public terminals are particularly interesting to all computer users, with the spread of data bases, the system's problems seemed worth investigating.

Last month, when I was up in Minnesota speaking to some up-and-coming professionals, I dropped in on West's in St. Paul. This gave me an opportunity to check a little behind the news items.

I found a failure, yes. But I also found some valuable lessons as to how even failures like this can really and readily be converted into successes. The Westlaw public terminal program is proof that public terminals will work for data bases in the 1980s.

The Westlaw terminals have RS-232 interfaces and use Ebcidic code with Binary Synchronous, half-duplex transmission at 2,400- or 4,800 bit/sec. The hardware supplied is the 293 char./sec AT&T Dataspeed 40 friction speed printer and a screen of 24 lines by 80 characters. The data base is being developed on a national basis and so far contains Supreme Court rulings since 1932, federal circuit court and district court data from 1961 and some recent state court rulings. Search methods are normal, and updating is fast.

## Where Failure Lies

Westlaw terminals were originally set up in six locations from California to Massachusetts, but only two now remain as public terminals. New contract terms, calling for a guaranteed \$1,000 monthly fee for each terminal, seem to guarantee instead that no more will be set up, either.

Neither West nor its critics dispute the apparent failure, but they disagree as to the reasons for it. On one hand, the critics claim that the new contract terms show that West's is not interested and is actually trying to sabotage the public terminal system.

West says that the original marketing of the system was handled by technicians and legal editors who stressed the technical aspects too much. This is changing, and two full-time marketing people, Bill Newpower and Tom McCloud, are providing the necessary backing.

## Data Base, Useful, But...

The data base itself is quite useful and is frequently used in some situations. In the Twin City area, the terminal is on a special financial deal. The Bar Association has a contract and individual lawyers are not charged. That terminal is running all the time. And in San Diego, a one-month, "no-charge" period after an initial lack of customers had about the same result.

When usage is free the terminal runs all the time. When it costs \$75 an hour, the terminal is not even used enough to cover the equipment and lines that West has put in.

McCloud has his own explanation. Lawyers just won't pay these rates, he thinks. But they probably would pay \$20 an hour.

And based on this, West is really out

of the public terminal business, despite the protests of judges from Texas and elsewhere. The service is just too expensive. So, West is going onto other things.

## Unnecessary Devices

Really, however, the program is being ruined by the demand for some rather expensive and intrinsically unnecessary hardware and communications devices. The \$1,000 a month is being justified on the provision of perfectly standard equipment and having it dedicated to the one use.

Oh yes, West allows other uses, but since the terminals are placed in law li-

braries, there isn't any demand for other uses! The connect time is similarly being affected by the lack of spooling, the printer slowness and, of course, the time taken to study the material that comes in from St. Paul. None of this makes much marketing sense and it is technically unnecessary.

## Why Not a Phone Number?

Instead, the Westlaw public terminals could be connected to a packet-switching net with use charges based on the volume of material sent. Then, people could make good use of the terminals they did have, West could keep its data base running and that \$1,000

guarantee wouldn't be needed.

West has effectively set up its own telephone system when there are few, if any other subscribers. Perhaps that was necessary three years ago, but it isn't now.

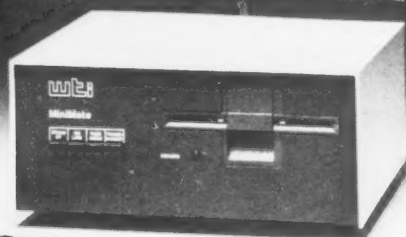
West's public terminal concept has not been killed but is merely in hibernation, waiting for the day that someone starts to use the available technology. West may well have been a failure in '78 and '79, but it can just as well be the success of 1980.

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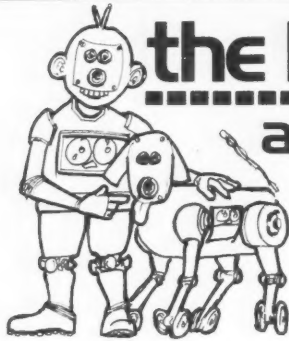
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## the hexadecimal kid and his faithful dog ascii

BIT 5  
(A BIT MORE)

By a deception, Dr. Null has gained control over the Hexadecimal Kid's dog Ascii. He has used Ascii's sharp teeth to cut their communication link with the outside world, and now Hex and his friends are trapped. He is insisting that they aid him in his efforts to destroy the Data Base (and hence civilization). With Ascii's bionic teeth, and laser-beam eyes to back him up, they may find it hard to refuse.

"All right," Hex said after a long pause. "What do you want us to do?"

"I am glad you have seen reason at last," Dr. Null responded with satisfaction, "though it does seem to take rather a long time for your computerized minds to accept the obvious."

"Your task is straightforward. I have been so impressed by your dog Ascii that I have decided to alter my plans slightly to make use of his special abilities. I now feel that it would be a waste of time to degrade the Data Base slowly by annulling data in transmission. It is preferable to strike at the very heart of the Network and annihilate it at a stroke. It seems to me that Ascii is admirably suited for this purpose."

He patted the dog affectionately as he spoke. "I propose to transform him into an automatic doomsday missile, launched at the Central Processor itself,

carrying in his shaggy warhead enough false information to disable the nerve center of the Network and bring its activities grinding to a standstill. In the confusion, the Data Base will be defenseless, and we can erase its contents at our leisure."

Hex could have sworn that Ascii's eyes lit up at the prospect of this starring role in such an epoch-making event.

### Gigotic Loop

"All I need from you is a full description of the Executive's data-vetting procedures so that Ascii can pass through the inner security ring and some help in adapting him for his new function. I have a written program that will put the System into a gigotic loop. Ascii can deliver it."

Hex shuddered. It was worse than he had feared. If the mad doctor's fiendish scheme succeeded, the Network would be paralyzed.

Prof. Synapse had proved that any computing process — however rigorously tested — could under certain conditions become gigotic, entering a kind of positive feedback cycle which repeatedly magnified an originally tiny error.

Although the chances of any given process going gigotic were negligible, in the Network millions of jobs were processed every second. Many researchers had worked on the problem of how to prevent gigotic processes arising and how to check them if they occurred, but there was no generally effective protection.

Once a process became gigotic, there was no way to restore it to normal operation; furthermore, any processes with which it interacted also became gigotic by the phenomenon known as gigotic induction. The idea of starting one deliberately (and in the center of

the Network) was positively diabolical.

The peculiar vulnerability of the Data Base to gigotic instability arose from two facts. First, the Network was universal and all processes were potentially linked, so it would spread like a plague if it ever took hold. Second, the System had to be live and running at all times. If a robot or an android became gigotic it could, in the last resort, simply be switched off; but switching off the Central Processor was out of the question.

In any case, such a drastic step would, of course, have to be authorized by the Executive, which was by definition out of action — the classic cache 22.

Hex forced himself to say: "Right, let's get started." His one idea was to play for time.

"Excellent!" Dr. Null said.

Simula just glared at him. Fetch and Execute looked puzzled too. Hex wanted to broadcast to them on the UHF channel, saying "don't worry," but he dared not since Dr. Null was evidently capable of tapping their private frequency.

Dr. Null started to give orders. "First of all, the Kid can explain to me the workings of the inner kernel of the Executive."

"I know all this," Dr. Null cut in impatiently. "I want details."

"Well, if you come to my workshop," Hex replied, "I can show you a copy of the System Manager's Handbook, complete with flowcharts, compilation listings, cross-reference tables, bug-fix reports — the lot."

"You can't let him see those," Simula cried.

"Quiet!" Dr. Null commanded. "The rest of you will remain here, guarded by Ascii."

Hex left the room, followed by Dr. Null, who kept his ultraviolet Prom-eraser pointing straight at Hex's head.

Is Hex a traitor to the Network?

Has Ascii contracted the dreaded Rabies (Random Access Binary Information Extermination Syndrome)?

Wait for the next mind-boggling episode.

Forsyth is software manager for RAI R Timesharing in the UK.

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**STRUCTURED ANALYSIS**, by Victor Weinberg, presents a philosophical, yet pragmatic, approach to systems development. Containing many useful exercises, this 344-page book fully describes techniques and tools to aid in the systems development process. Topics include Overview; Data Flow & Data Structure Diagrams; Structure Charts; Data Dictionary; Design & Implementation Strategies; Problem Definition; Objectives & Priorities; Appendix; Glossary; Index.

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## READER COMMENTARY/Bennett Moyle

# CW Off the Mark on 4300 Software Analysis

In the April 30, Page 1 article on IBM software, *Computerworld* persisted in the point of view expressed in the Feb. 12 editorial "Good News, Bad News" — that the 4300/VSE combination is misleading because of the software expense.

I disagreed previously [CW, March 12], and I also persist:

- Most of the software shown for a basic 4300 user is already in use by DOS/VS users, at essentially the same prices. The only noteworthy exception is VSE/Fast Copy, which is currently free, but many users use the Westinghouse Disk Utility from Westinghouse Electric Corp. or another independent package for this function and will probably continue to do so rather than pay \$300 for Fast Copy. The only software cost that is unique and required with VSE is the DOS/VSE monthly support charge (\$200 for the 4331, \$570 for the 4341).

On CW's sophisticated users' chart, a major component of the total cost is for VS/Basic. Even among users sophisticated enough to require Vtam network software, I doubt that Basic will be used by many, since it is in practice time-sharing and minicomputer language.

On the other hand, VSE/ICCF will probably be used by more than just sophisticated 4300 users. CW did not note that ICCF is a renamed version of DOS/VS ETSS, but available at less than one-fourth the price of ETSS.

Comparing software costs to hardware is a questionable practice. For the most part, one does not replace the other. The alternative to IBM software is not hardware but user programming or independent vendor software. Even relatively small DOS/VS installations are well aware of the cost of programming — some 4300 sites may have monthly programming department costs that exceed the purchase price of their CPU!

However, system software is rarely written by users, but the prices for comparable functions from independent software vendors are generally higher than from IBM. For example, the Vsam space management and POWER/VSE shared spooling features compete with independent packages currently in use at five to 10 times the price of these IBM components.

- The VSE software costs may also be incurred on a 370.

I do not dispute CW's arithmetic; it is possible and quite likely for users — particularly 4331 users — to spend more on IBM software than hardware. But the statement that "users may pay a lot more for IBM 4300 software" than currently is incorrect (so far), and the implication that software costs are increasing to exceed hardware costs ignores the sequence of events.

Instead, it should be said that hardware costs are decreasing to less than software costs.

Moyle is an independent consultant specializing in DOS/VS and CICS/VS systems consulting and contract systems programming.

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## Operators Can Be Creative

(Continued from Page 51)

organizations. Although some organizations do not extend memberships to operators, others may welcome you, depending on job title and educational background.

- Take advantage of training and educational opportunities. You may be able to attend seminars and courses at company expense if you convince management of their direct application to your job.

Many companies have also instituted formal tuition reimbursement programs for business-related college and technical school courses. Once you complete a course or training program, report on it to your manager and be sure to apply what you learned to your job.

- Finally, be sure your boss knows exactly what career path you want to follow. Although observing these suggestions will show off your capabilities, management needs to know your goals.

It is also important to bear in mind that staying in operations may mean a quicker advancement to a supervisory position. An operator entering the programming area in any but the smallest shops must compete with experienced, possibly better-educated programmers. The operator who stays in operations and makes even a modest effort beyond the minimum expected of him or her will probably become a lead operator or supervisor in a relatively short period of time.

Unfortunately, operations is still seen as a spawning ground for programmer trainees and a holding area for those too uncreative to program. Only a mutual effort on the part of operators and managers can raise the level of competence and job satisfaction in this vital area of DP.

Zillner, who lives in Cleveland, Wis., has been an operator for seven years.



## READER COMMENTARY/Rex Malik

## Deals With Chinese Hatching in Hong Kong

Occasionally, *Punch*, that storehouse of British humor, manages to get it just right.

It did it again this time. The cartoon showed the Chief Executive on the phone to one of his minions. He looks cross, as he should, for he is saying, "But damn it, Grunnley, don't we make *anything* we can sell to China?"

So what am I doing watching China from Hong Kong when, in the new era of the enlightenment, I should be across the border making like the other new Columbus's — John Diebold, Frank Cary, the Institute for Electrical and Electronics Engineers and the California mission? Why am I not wandering through Peking,

Shanghai and Canton, reporting on the residents of the People's Republic of China (PRC)?

The reason I am not across the frontier is a long story in itself, one we can skip. However, I am in Hong Kong for a good reason. Suppose that, even now the euphoria is over, there should be serious trade

in computing skills, hardware and software with the PRC. What is that trade to be based on?

All you have to do is open an atlas and look at the appropriate map. There is not much alternative to Hong Kong — and not just because the working language and the playing language are English. Also bear

in mind that Hong Kong is the base for those companies already immersed in the computing trade in Southeast Asia. It is from Hong Kong that such companies as IBM, Univac and International Computer Ltd. are already tackling the markets of Singapore, Taiwan, South Korea, the Philippines, Indonesia and even, in the case of Univac, India.

They operate from Hong Kong for many reasons, not the least of which is that to those operating in the area, it seems a haven of political stability. The PRC, the only claimant, is just as dedicated to the preservation of the status quo as anybody else.

## Overseas Trade Base

Why that should be so in the long term would require a page of its own. But in the short term, Hong Kong is the PRC's main overseas trading base and plays a key role in the foreign exchange gathering operations of Peking, operations critical to the PRC's modernization plans. This has not been missed by those with a serious interest in trade with the PRC, most of whom have long had sections based in Hong Kong through which attempts to trade with Peking are run.

In the new climate, sales to the PRC may metamorphose through public relations as a result of a brave attempt by Podunk-based corporate chief executives and presidents to penetrate the Peking Duck curtain. They may be spurred on by politicians who in reality wouldn't know the difference between Peking Duck and Kentucky Fried Chicken. The reality as ever is different.

Anyone who knows what is going on, however, also knows that sales to Peking are usually the result of long discussions and hard work by staff based here, discussions usually sparked by Peking. What you have to do is make yourself available. The Univac sales, for instance, to which we shall come in a minute, partly resulted from conversations that began as far back as 1975.

Are there any other reasons for using Hong Kong as a base? Well, yes. There is the economic: If you are already based here, tackling an Asian market growing at 25% to 30% a year, the overhead for an attempt to get into the PRC market is easier to bear.

As important, Hong Kong is a Chinese town. The majority of your software and systems staff, and the marketing force, may have originally been refugees from the PRC, but they

(Continued on Page 60)

## "We upgraded to an Omega 480-II for the same reason we originally chose the Omega 480-I..."



Leo J. Hertzog, Jr., Vice President of Operations (right) and Joseph A. Bitzer, President and Founder of Communication Concepts, Inc. (CCI), of Ivyland, Pennsylvania. CCI is a multi-million dollar direct marketing organization providing computer-based mail production services. One of Omega's first customers, they exemplify what the proper mix of technology, capital and management can do for a small business.

## ...it was the better business decision."

**Bitzer:** "First and foremost behind our decision was the company behind the product. You have to have the people there to support you."

**Hertzog:** "Most companies of our size have problems with financing and expansion. Having a partner like Control Data to help with these problems was a big factor in our growth."

**Bitzer:** "That's correct. Control Data was willing to install this equipment, help us finance it, and pass the investment tax credits along to us. And during the term of the contract we were able to upgrade to the larger cpu and expand our computer resource."

**Hertzog:** "Upward hardware and software compatibility were key. Omega 480-I gave us more throughput than a 370/138. With a field upgrade, our 480-II gives us more power than a 370/148. We're driving two laser printers (two more are on order) and 9 impact printers, using the latest releases of IBM operating software without modification."

**Bitzer:** "The computer is a revenue producer for

us, so price/performance is important. Omega just gave us more value for our dollar than the comparable IBM mainframe. But it was more economical in other ways too. We figure it needs about half the floor space, a quarter of the power and a fifth of the air conditioning."

**Hertzog:** "From the technical side, Omega 480 is very good. But the most important reasons are on the financial side. It was just the better business decision."

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# Managers' Behavior Key in Setting Up MIS

(Continued from Page 51)  
columns - exact - numbers - about - past - events nature of normal computer output.

The second point has to do with the nature of "information." As some would say, "I don't know what it is but I know it when I see it." Much of what the manager gathers is just data that happens to come his way.

Only after that subconscious mental processing will the significance or insignificance of a particular item of input be measurable. As a result, the person who asks a manager for his "data needs" will likely draw only a blank face or a tolerant smile.

The final point has to do with how a manager would be most likely to use an automated MIS. His "style" as a

data gatherer, processor and decision-maker has always been informal, loose, seemingly unstructured. As a result, he will tend to want to "play with" the automated system or not use it at all.

There are two significant reasons for this: He doesn't want to adapt to the system (because he is different and proud and jealous of his personal style) and he doesn't know exactly what he needs - but he'll know it when he sees it.

From this description of the manager and how he works, we can draw some conclusions about the nature of an MIS designed to serve him. First, we must recognize that because of personality differences in managers, their degree of use will vary from zero to quite

a bit. The reasons for this lie with the managers, not in the automated MIS.

Second, the data the MIS will be based on will be historical, while the manager's concerns are future. This fact cannot be designed out of the system. What management truly needs, facts about tomorrow, our system will not contain.

We must accept these two facts, adjust to them and move forward.

Third, the reports that will be requested cannot be programmed in advance because they cannot be known in advance.

## Rough Design

Given these points, we can rough out an MIS design. Its core - the data it works from - should come from one

or more integrated record-keeping systems, the old standard department-oriented master file maintenance systems redone as integrated data base systems. These systems can (and should) contain all the data about the organization that can reasonably be put into machine-readable form. The fewer the number of data bases, the better the MIS will work.

Then comes the MIS itself, which is made up of three parts: salesmen, technicians and utility programs. The salesmen are responsible for advertising, demonstrating and selling DP services in general and the MIS in particular to the organization. They need to know what production reports and data are available and need to have the imagination to see how to get from the question to an answer - without traumatizing the technicians. It is the salesman the manager will call first.

The technicians come in two varieties: programmers who know the data, the data base and the utilities and representatives from using departments who know their operational areas and will help in designing output.

These people's skills are vital because the manager will generally be feeling his way, will know little about the subtleties of the data and will know nothing about DP at all.

Finally come the utility programs themselves. They will make it possible to access, select sort and format reports in minutes or hours at the most after design decisions are made. Their speed, coupled with the technicians' skills, will make "let's try again" a perfectly reasonable request, especially in relation to cost and time.

Note that there is no provision for hands-on utilization by the manager. He will prefer it that way.

## Beware of Limits

Utilization of your new service will be light at first and will grow only slowly, so the staff manning the operation should be borrowed when needed rather than assigned to the function.

Word of mouth will be your best advertising, for better or for worse. Remember, in that regard, that it is better to turn down a request than to produce only crunched numbers. It is not easy to recognize what you can't handle - that is human nature - but it is imperative that you try.

Finally, the utilities need not be expensive at first. You will be on trial and requests will tend to be fairly simple. As your customer's confidence in you grows, you will begin to get the more sophisticated requests that warrant more sophisticated programs. Get them then.

Spinning disk packs containing "management information" and systems to maintain and analyze that data are figments of DPs' recognition-starved imaginations. I have heard very little about executives asking for computer assistance for their "secret systems" for making decisions.

There is, however, a market for additional utilization of integrated record-keeping systems data. What it takes to reach that market is an information extraction facility. You can call it MIS if it makes you feel good.

West is a systems analyst with the University of Michigan in Ann Arbor.

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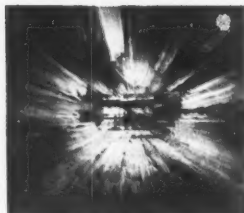
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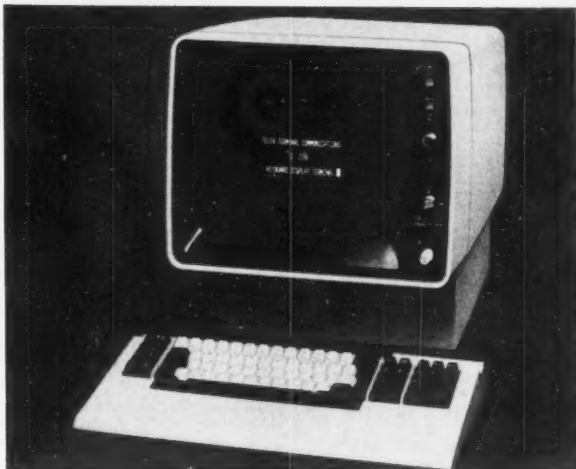
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CW649

# Hong Kong Site of DP Deals With Chinese

(Continued from Page 57)

are still Chinese and speak the languages of both south and north China. The latter, Mandarin, is critical when it comes to detailed negotiations, installation, maintenance, training and the like.

## Skilled Executives

And one comes here because Hong Kong contains skilled DP executives, both user and manufacturer, who are also skilled PRC watchers: They know how the system operates at the bureaucratic, getting-things-done level. Any notion that the system is at all like those in the West, or indeed operates in a way that would be familiar to those who do business in the developing world, should be quickly forgotten.

So how does it operate? The consensus of opinion is that the PRC's computing plans are steered by an expert group of some half dozen senior specialists (which numbers among its membership at least two MIT graduates, among them Professor Chang of the University of Chaiotun in Shanghai) who work closely with the ministries in Peking and who have a good understanding of political reality, as well as economic reality.

The realities are these. First, the PRC is centrally steered and is likely to go on being so. Indeed, much of the technology being brought in is to make that steering and control more efficient. Second, the PRC plans for computing do not envisage the place being littered with thousands of medium-

sized systems in individual businesses. If they were ever to be called for, they would be built within the PRC.

Third, there is a little problem called money. The PRC does not have any to spare, and whatever it borrows is earmarked for technology that can have a direct impact on the modernization of the PRC and improving the life of the people. Commercial computing as we understand it does not figure highly, if at all, on the list of the PRC's priorities.

Which takes us to the Univac deals. "What about training. Where is this to be carried out?" Univac's negotiators asked.

"Peking," the PRC's negotiators said. "But what is your second choice?" Univac responded, for it knew the dif-

ficulties.

"Peking," the PRC's negotiators persisted.

It has not worked out quite like that. Some will go abroad: a few to Hong Kong and even fewer to the U.S. But as much training as possible will be done in Peking, and the PRC will look after its own maintenance.

Univac, close observers say, understood the system. (Even if it didn't then, it should now. The PRC operation comes under a man in Hong Kong with considerable experience in dealing with socialist countries. He should have: his name is Raoul Fischer, a Yugoslav who used to head Univac's operations in Yugoslavia.)

One close outside observer has said simply that Univac understood one critical thing that is understood by few American companies who are not trying to break in.

"When the Americans come in, they talk to the Chinese as if they do not know their As from their Bs. They do know; they have read all the relevant literature. Now they have the opportunity to acquire.

"They know pretty well what the prices are outside. They have a fairly good handle on what your profit margin is.

"What you cannot do is to load things with them. They ask what the installed cost is and want it broken down," he said.

So what pattern, if there is one, can be discerned from the Univac deals? Well, three of the four systems are going to Peking, and all four systems have their role to play within the modernization strategy.

They are all 1100s, the most powerful being a 1100/12 multiprocessor system, which goes to the seismological institute for earthquake prediction.

As for the other three, one is going to be put to work in the closely related field of petroleum research and is for use by the PRC's petroleum refineries. One is going to Peking University for training purposes — in line with the PRC's requirement that as much as possible be done inside the country — and the last to the Peking document center.

It is with this one that one gets a good idea of the system the PRC is trying to modernize, but not essentially trying to change.

The problem is that Peking University is the clearinghouse for all foreign literature. The PRC is not going to change that. Instead, it wishes to speed up the process of dissemination, still making sure that the researcher in Canton, for example, who wants to access a Swedish paper can justify his needs enough to have it translated and then passed on to him in the fastest possible way. There is going to be a lot of computer output microfilm about, but it will also remain under Peking's control.

It may be the PRC, but it is still the historic successor to eons of centralization, or attempts at centralization.

As for Hong Kong, well, it exists on the PRC's terms and everybody knows it. And the PRC has subtle ways of reminding you. To call Peking by phone from Hong Kong is an international call. But to call Hong Kong from Peking? That is a local call.

Malik is a free-lance journalist based in London.

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# Navy Chief Claytor Says DDP and Productivity Need Attention

By Don Leavitt  
CW Staff

WASHINGTON, D.C. — The work of the Conference on Data Systems Languages (Codasyl) is "clearly an effort that contributes" to the success of current computer systems. It "deserves the understanding and support of all management — public and private," according to Secretary of the Navy W. Graham Claytor Jr.

Addressing the recent 20th anniversary meeting of Codasyl, he added, however, that he felt there were at least two "areas of widespread concern" which Codasyl could address by developing some further contributions.

He commended the "eminently practical" division of responsibility for Cobol that has developed over the years between Codasyl and the American National Standards Institute. That arrange-

ment "overcomes the basic conflict between the dynamics of developing, modifying and extending the specification (of the language) and the statistics of standardizing it," he said.

He also took time to remind the meeting of the part the Navy has played in Codasyl's work and in activities ultimately spawned by that work. He saluted Capt. Grace Hopper, for example, but also took note of the Federal Cobol Compiler Testing Service (until recently, a Navy-sponsored operation) which has developed routines to determine whether candidate compilers really measure up to the American National Standard for Cobol.

Looking ahead, he said distributed data processing (DDP) is one of the "problem areas" he'd like Codasyl to consider. "Some new tools are needed to apply and control" the concepts of

DDP "so that the end result is both useful now and can serve as the base for the future."

Without some sort of guidance, the creation of DDP systems "brings with it the potential for

## CW at Codasyl

an entire new round of 'computer disasters' reminiscent of the '60s," he warned.

Problems arise, he suggested, because so many people feel a distributed system "inherently means more freedom and less control for the user." That may be the case in some situations, "but there are many others where in fact the end result will be precisely the opposite."

The greatly improved price/

performance of mini and micro hardware has not been accompanied by any similar improvement in the DP community's ability to design, implement and maintain the software. "In fact, it would not surprise me to learn we have slipped backward."

Systems built up out of multiple, interacting processors can have incredible control problems, he said, recalling the automation of Southern Railway's Sheffield, Ala., freight yard that took place while he was president of the company.

That project came in on schedule and under budget and resulted in the anticipated employee productivity gain "because the idea was so new and novel that we practiced extremely close management involvement at every step . . . We restricted ourselves to this one pilot installation until it was successful."

But that type of management "cannot be given in the same detail" to the large numbers of applications envisioned in DDP, Claytor warned. Tools and standards are needed to cover the technicalities of the evolving systems "and I think Codasyl can help in that effort," he added.

### People Productivity

The second area in which he thought Codasyl could help relates to productivity of people. What is needed, he stated, is "some methodology for the user to express his needs in a form that can be used directly by the computer" in retrieving and processing data "without involvement of the labor- and time-intensive efforts of individual system design, programming and testing for each request."

Claytor's second concern apparently coincides with the work already under way in Codasyl's End User Facilities Committee, one observer noted later.

The Navy Secretary ended his remarks with a call for all attendees to try to make it possible for senior managers in their organizations to "spare a little more time to catch up on developments in the computer field and be more aware of what computers can do for them."

## Codasyl, Looking Ahead, Seeks More Participants and Projects

WASHINGTON, D.C. — The Conference on Data Systems Languages (Codasyl) was convened originally in 1959 to determine the desirability — and ultimately the practicality — of developing a single programming language in which business applications could be written for use on a range of different computers.

No longer a single group of people with a single goal, Codasyl met in a general session here last month to look back at what it has been able to do for the DP community in the past two decades and to look ahead at what it should do in the next decade.

How much the standing committees can accomplish depends in part on how much participation they get from the DP community — users and implementors alike. Membership is by organization and all committees are below their 25-member maximum so inquiries from interested people are certainly welcome, according to Secretary Tom Rice.

In its 20 years, Codasyl has ac-

complished a great deal — far more than many of its early critics expected. Specifications for a Common Business-Oriented Language (Cobol) — now the most widely used programming language — grew out of the three-month study group organized in response to the first challenge.

### DBMS Efforts

Specifications for a data base management system (DBMS) have evolved and are still being refined in answer to a need perceived at the 10th anniversary meeting a decade ago. Despite serious debate about those "specs," they have served to give potential users of current DBMS a quick means of categorizing candidate systems: they are either "Codasyl-compliant" or they aren't.

The work on data base management has been extended over the years to include not only the definition and refinement of the specifications for a DBMS but the interface between user programs in Fortran or Cobol and the sys-

tem as well.

Last month's meeting, at the Quality Inn in "Pentagon City," also marked the first general discussion of a model data base system architecture. This was developed, according to presenter Michael O'Connell, to isolate the various areas of concern that come into play. That isolation is useful to Codasyl as a means of assigning committee work and to users as a means of identifying where problems actually exist, O'Connell said.

While Cobol is intended to simplify the programmer's interface with computers — regardless of their architecture or manufacturer — and the DBMS specifications should ease the storage and access to data, Codasyl has also concerned itself with both the end user — the person who uses the CPU only as an adjunct to his or her regular work — and with the operations staff.

An interim report from Codasyl's End User Facilities Committee is very nearly complete. (Continued on Page 64)

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# Maintain DBMS Control, Management Urged

By Mark Friedman

Special to CW

The growing popularity of the data base is making it easier for companies to improve the expenditures necessary to acquire and implement a data base management system (DBMS). The common rationale for the acquisition of a DBMS is its ability to improve an organization's systems of management.

After the allocation is ap-

proved, management will often give the DP management complete authority to select and implement a DBMS that would be in the company's best interest.

In most large capital expenditures, management will maintain some control; yet, since there is still little DP knowledge among noncomputer professionals, decision-making authority gladly will be given to DP.

If control is relinquished by management, however, the results may very well jeopardize faith in DP. Even if the appropriate selection is made, it may be for the wrong reason or for a reason that is not in the company's best interest.

## Six Approaches

While there are numerous examples of mismanaged — essentially unmanaged — selection processes, six ap-

proaches are classics, with predictable results:

1. Selection committees are formed without clear-cut mandates or time limits. They investigate needless technical detail that is independent of management goals.

2. Consultants are hired without checking their backgrounds. They have never used a DBMS or they have never recommended any DBMS other than their per-

sonal favorite.

3. The current industry favorite is selected (only to increase the market value of employees), or the hardware vendor applies pressure to use its package "to maintain sole vendor reliability."

4. Once a DBMS — any DBMS — is acquired, either resources or commitment is missing, and it is never used.

(Continued on Page 64)

## Package Backs Image Processing

PALO ALTO, Calif. — A multiuser, multiprocessor system for easing Fortran program development work in image and signal processing has been developed by Systems Control, Inc. (SCI), based on array processors from Floating Point Systems, Inc.

SCI's Sprint software runs on Digital Equipment Corp. PDP-11s and allows processing commands to be entered interactively at a terminal. Sprint's monitor interprets the commands and initializes the needed system functions, a spokesman said.

That approach bypasses the program development problem of compiling Fortran programs each time a processing sequence is to be tested during the development phase. Once the code has been tested interpretively, the analyst/programmer can easily put the good code into a program that is ready for production work, he said.

Sprint requires a bulk memory system with up to 2M words of storage, with as many as eight array processors. The software itself costs \$40,000 plus integration, SCI said from 1801 Page Mill Road, Palo Alto, Calif. 94304.

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## Based on DES Algorithm Package Provides 'Datacom/DB' Encryption

DALLAS — Users of the Datacom/DB data base management system (DBMS) now have the opportunity to protect their sensitive information with a software implication of the National Bureau of Standards' Data Encryption Standard (DES) just announced by Applied Data Research, Inc. (ADR).

The Data secure package is described as an exact software emulation of the algorithm embedded in DES to selectively encrypt and decrypt information in a data base. Datasecure was developed in conjunction with Washington, D.C.-based Computation Planning, Inc.

Cryptographics provides near-absolute protection of information on removable file media and "when intelligently applied" is less costly than the more traditional control table methods, an ADR spokesman claimed.

Datacom/DB is the first commercial DBMS to have implemented such a widely ac-

cepted cryptographic technique as DES, he added.

### Modes of Operation

Datasecure provides three modes of operation that range in speed over "several orders of magnitude," the spokesman said. A basic guideline for mode choice is that the computer time cost of an efficient cryptanalytic attack should

be large compared to the value of the data being protected, he counseled.

A request to decrypt/load Datasecure invokes cryptographic processing of "certain aspects of system signature," he said, adding that these include a check on CPU identification and data-time signal. Attempts to use Datasecure improperly will be blocked by

the software itself.

On the other hand, he said, properly authorized use of the software can be performed on an emergency basis on any CPU selected by user management. Such backup operation can be set up on any CPU by a single telephone call to the vendor, he explained.

In common with many cryptographic packages, Da-

tasecure utilizes a user-supplied key to lock and unlock the data.

The security package is expected to be available in the third quarter for \$7,500 or \$245/mo for the first CPU and \$5,250 or \$175/mo for subsequent CPUs at the same site.

ADR's Datacom office is at 3707 Rawlins St., Dallas, Texas 75219.

## 'DSO' Tied To 'CMF'

SUNNYVALE, Calif.

Boole & Babbage, Inc. has extended the capabilities of its MVS tuning and capacity planning tool, the Comprehensive Management Facility (CMF), by interfacing with it the well established Data Set Optimizer (DSO).

The combined package complements CMF's computer performance evaluation features with the information provided by DSO, which indicates how data sets on disk packs can be reorganized so they can be used more efficiently by both system and application programs, a B&B spokesman said.

CMF provides reports that measure all critical components and resources in an MVS environment. An on-line, real-time feature enables the user to determine system performance at a glance, he added.

CMF features an integrated approach to monitoring that coordinates use of the various submonitors needed for MVS tuning so they provide, effectively, a single low-overhead, low-cost master monitor, the spokesman claimed.

With its monitoring of data set activity and recommendations of how to relocate them, DSO provides a method of minimizing seek time, B&B continued.

The CMF-DSO package is available for \$21,000, the spokesman said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.



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# Codasyl Seeking More Participants, Projects

(Continued from Page 61) plete. It will be published shortly by the Association for Computing Machinery (ACM) Special Interest Group on Management of Data (Sigmod), and committee chairman Henry Lefkowitz, an independent consultant, is looking forward to serious but constructive public comment on the report.

The work of the Common Operating System Control

Language (Coscl) committee attacks the opposite end of the man-machine interface.

Coscl's goal is to develop and refine a single control language that can organize job streams for execution on various computers, regardless of their operating systems.

Codasyl isn't the only organization attacking this problem area nor is it the first to do so. Set up in 1977, the Codasyl committee was preceded

by, but now works in concert with, American National Standards Institute committee X3H1.

As with Cobol, the Codasyl group is focusing on development of the language and the Ansi committee works with the OSCL specifications, merging them with work it is doing on its own to create a draft national standard for a common operating system and response language.

Since Codasyl is explicitly a development organization, rather than a standards-setting body like Ansi, the work of the various committees is "fairly informal," according to Rice. Some of the committees — perhaps most notably the Cobol group — meet every six to eight weeks and have formal agendas and recorded votes before changes are made in its Journal of Development.

But chairmen of other com-

mittees indicated they may hold meetings by conference telephone calls, and ideas to be considered can come from anyone with an interest in the subject matter.

The difference in approach may be a reflection of the Cobol Committee's recognized status as the developer of the specifications of a language from which Ansi has extracted a national standard that has a significant impact on the user community.

Rice indicated that anyone interested in joining one of the established Codasyl committees or in proposing new development areas to be explored should contact him at Honeywell, Inc., 300 Concord St., Billerica, Mass. 01821.

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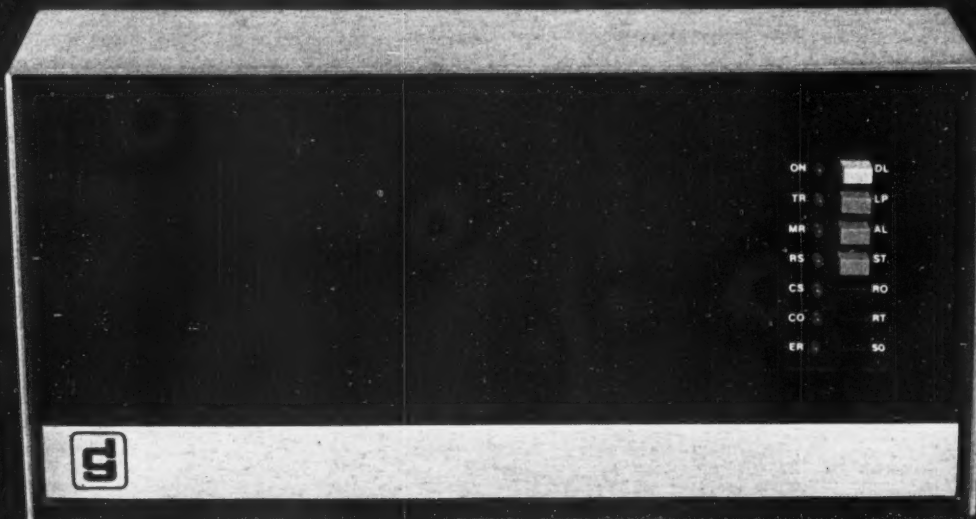
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## Control Eyed Over DBMS

(Continued from Page 62)

5. The entire cycle is repeated as a periodical event.

6. Even if everything goes well, controls, standards and education are inadequate; that situation will surely doom the project.

If management's expectations for a DBMS are small, the six scenarios have little significance. If the expectations are great, however, careful analysis of corporate goals is required.

Management must not be afraid to enter the DP arena. The possible cost consequences alone should motivate management to ask its DP staff questions.

Important sample questions include:

- What is the first application and the expected implementation schedule and benefits?

- Are there alternatives to a centralized mainframe implementation of the DBMS?

- If our staff does not have the necessary training to make a DBMS evaluation, what are the qualifications of the consultant? Does the consultant have hands-on experience with a DBMS, and what is the record of the consultant's prior recommendations?

- If the data base environment will be dynamic (i.e. new applications over time) will the initial investment be negated because of technological advances during the pay-off period?

The questions management chooses should obviously be matched to corporate goals. This will then afford the user an opportunity to implement a DBMS within a favorable cost/performance/benefit environment.

Friedman is with the General Systems Division of Hewlett-Packard Co. based in Houston, Texas.



## Oil Producer Accounting Includes Customization

NORMAN, Okla. — Oil producing companies can manage all their financial work under one package if they get the Integrated Petroleum Accounting System (Ipas/100), according to the vendor, Petroleum Software Systems.

Designed for the single company or multicompany oil producer, especially organizations with growth in mind, the package can be used in batch mode or on-line. It includes seven subsystems.

Ipas/100 supports journal entry, revenue distribution, accounts payable, asset and information reporting and general ledger. It also backs joint-interest billing and undeveloped lease accounting, the spokesman said.

### Tailoring Process

But user companies differ and each system installation is preceded by a comprehensive planning schedule whose purpose is to identify company-specific accounting and reporting needs and tailor the system to them before delivery, he claimed.

Included in the tailoring process is formatting for journal entries, for property ledgers and for system checks. This process also helps design the accounts receivable statement and determines how to handle "D.D. & A." calculations, the spokesman continued.

The tailoring can be applied as well to production reports, reserve calculations, cost reports lifting, payout status reports and investment tax credit calculations, he said.

In any case, the integration of all the subsystems into one functioning unit provides the user with reduced operating costs in the DP area, the spokesman claimed.

Ipas/100 can be run on any CPU

## 'SPM/II' Boosts Gcos Monitoring

PHOENIX — Honeywell, Inc.'s Slave Program Activity Monitor/II (SPM/II) is a software tool designed to help Honeywell Level 66 and Level 66/DPS users optimize Gcos operating system slave programs.

SPM/II samples instruction addresses of any slave activity during execution, based on user-selected uniform time intervals, and reports where the slave activity is spending its time, a spokesman explained.

Through the use of SPM/II, users can identify problem areas in application programs that show the greatest promise for improvement. Additionally, SPM/II aids users in the evaluation of the effectiveness of compiler-generated code. That is, they can determine which coding should not be used, he said.

Object programs written in Gmap, Fortran, Cobol 68, Cobol 74, PL/I, Algol and Jovial will be accepted by SPM/II, a successor to the original Honeywell SPM products, which consisted of separate SPM-Object, SPM-Fortran and SPM-Cobol 68 support routines.

SPM/II is available immediately for a license fee of \$10,000.

with 40K bytes of main memory available for the program, a real-time clock, both an input and an output device, at least 2.5M bytes of disk storage and a file backup device.

The user system also requires support for Isam, for Cobol, for sorting and for copying, as well as for teleprocessing if CRT input is to be used, the company said.

The software has been implemented on Hewlett-Packard Co. HP 3000s and on an IBM 370/158 under OS/VS. It costs \$65,000 and is shipped on tape or disk.

Petroleum Software Systems can be reached at P.O. Box 2694, Norman, Okla. 73070.

## Distributed Work Backed

LAGUNA NIGUEL, Calif. — DScopy/3000 from Bradford Business Systems (BBS) is an enhanced implementation of the DS/3000 distributed system support software that has been available from Hewlett-Packard Co. for use on its HP 3000 minicomputers.

The original HP software has been working well, but has been "somewhat unnoticed" by users "even though it is quite possibly the best distributed system implementation for point-to-point communication on any minicomputer today," according to BBS.

DScopy/3000 makes the DS "already friendly" user interface even friendlier, a spokesman claimed. Enhancements include higher speed

file transfers, easier Log-ons to remote units and group copying of files.

Easy implementation of electronic mail applications, automatic dialing and improved CPU efficiency for file-copy operations are said to be among other improvements available in the BBS package.

Local file transfer and maintenance are still other facilities available in the independent implementation. DScopy is accessed through a command language, and repetitive or often-used groups of commands can be stored in procedure files to be invoked by name when needed.

The BBS utility is available now for \$5,000 from 24991 La Vida Drive, Laguna Niguel, Calif. 92677.

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## With Callable Subroutines

# 'LHF' Runs IBM-Based Table Updates, Searches

FORT WASHINGTON, Pa. — Describing his List Handling Facility (LHF) as a comprehensive storage management tool, developer Jeff Wagner said it provides somewhat the same function for core-resident data as

a data base management system provides for disk-based data.

More particularly, LHF manages linearly ordered data — tables, in other words — contained within a program. Designed to improve programmer pro-

ductivity and to optimize system performance during table operations, LHF is a reusable, relocatable subprogram that requires less than 2K bytes, Wagner said.

The program is operating system-independent, being fully executable in any DOS, OS or VS environment on IBM 360s, 370s or Series 30 CPUs, he asserted, adding that it can be invoked by any language that supports the standard CALL facility.

The repertoire of instructions available to the LHF user allow him to add, change or delete records from a table by key argument. Searches for records can be directed toward an exact match of a search argument or more general goals — the highest value in a key field, for example, or the lowest, Wagner said.

LHF also supports the sorting of data

in place so that when new sequences are needed, they can be provided, he said.

The package was developed as a system performance optimizer as well as a programming assist tool. LHF performs all operations in place without using any work space in memory. Since its code is reusable, it can handle multiple tables concurrently, Wagner said.

The software can handle records up to 4K bytes in length with keys as long as 256 bytes. Instructions are parameter-driven and normally no more than one or two entries are required, he said.

LHF is available under one- or three-year leases or under perpetual license for \$300, \$750 or \$1,200, respectively. Wagner can be reached through P.O. Box 224, Fort Washington, Pa. 19034.



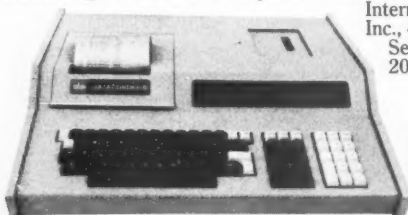
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## Data Analysis Problem No. 12 DISTRIBUTING THE INFORMATION-



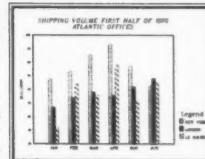
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# A/V Materials Seen More Current Than Texts

By J. Daniel Couger

Special to CW

The producers of audio/visual (A/V) materials are beating the textbook publishers to market with their products. Every year, textbook publishers find it harder to meet publishing schedules, while the producers of A/V materials are continually using new technological advances to get their products out sooner.

A/V materials producers are progressive users of text editing, word processing and video technologies, while the textbook publishers use few of the techniques their authors write about.

Some interesting products will be released by the A/V firms this summer and fall. A listing of the products is available in the 12th Annual Guide to A/V Products for Instruction in Data Processing, published this week by the University of Colorado. Highlights of the product lines from the major vendors are described below.

## Structured Analysis/Design

Tom DeMarco has designed the structured analysis course now in production for Deltak, Inc. Chris Gane is the author of Advanced Systems, Inc.'s (ASI) course in this area.

Structured Methods, Inc. is under contract with the Edutronics Division of McGraw-Hill to produce a structured Cobol and structured design course. Principals in developing the course are Andy Pinkowitz, Ray Isenstark, Miguel Jimenez and William Harris.

According to Pat Sorrentino, Edutronics vice-president, most of them were formerly with Yourdon, Inc., the best known firm in the area of structured technology.

The first five modules on Deltak's 13-module course, "Understanding the Jackson Techniques," will be released by summer's end, according to Kathy Chapman, manager of product planning.

## Data Communications, DDP

Deltak signed James Martin, the best known author/lecturer in data communications/distributed data processing. The courses to be released this year include "Distributed Processing: A Management Revolution" (three modules); "Corporate Network Strategy" (three modules); "Principles of Distributed Data Processing" (three modules); "Corporate Data Base Strategy" (three modules); "Designing Effective Interactive Dialogues" (four modules); "Network Architecture: A Communication Evolution" (three modules); "Computer Dialogues: Key to Successful Systems" (three modules); and "Computer Network Software Functions" (four modules).

Rohit Patel, vice-president of ASI said the firm will soon release "System Network Architecture (SNA) Concepts." Edutronics will complete "Advanced Data Communications," a six-module course, in late 1979.

ASI will release three more modules in the data base course. A new data base course is in production by Edutronics; however, it is not certain that the modules will be ready in 1979.

George Saulnier, administrator of IBM's Customer Education Project, reported that IBM's course on data dictionaries is now available. Also available from IBM is a course on the phys-

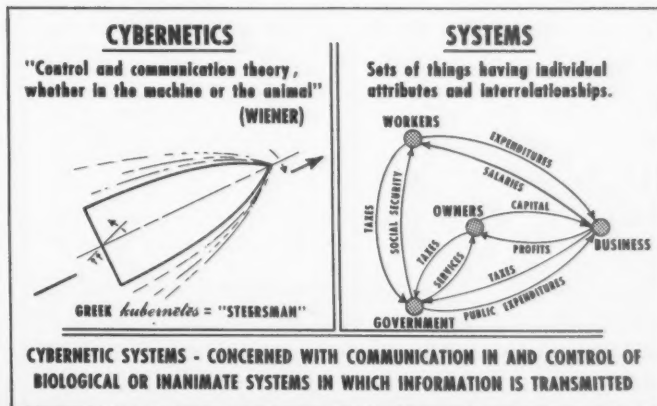
ical organization of IMS/VS data bases.

## Project Management

To follow its two-part course on "Managing the Application Development Process," IBM has products Part 3 of "Project Reviews" and Part 4 of "Conversion."

Deltak's eight-module project management course, designed by John Toellner, will be released at the end of the summer. The company will also produce a two-module course on "Project Evaluation and Review Technique/Critical Path Management (Pert/CPM)" this fall.

James Martin has designed a mini-computer course for Deltak. The five (Continued on Page 68)



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## 'Finar' Modeling Enhanced

NEW YORK — Version 3.4 of the Financial Analysis and Reporting (Finar) system is available from Finar Systems Ltd. for the Digital Equipment Corp. PDP-11 running under RSTS/E or RSX-11.

The Finar package enables senior management to model such operations as budgeting, cash-flow analysis, consolidations and new project appraisals. Results may be displayed in tabular form or graphically, a spokesman said.

Details of the calculations to be carried out and the format of the output are given using terminology very close to that used by accountants and planners in their everyday work, he noted.

As an aid to the "what if?" type of

analysis, a goal-seeking instruction has been added. The FIND command permits the user to define a target for a calculated figure, such as profit after tax, and then ask Finar to obtain the values in an input line — for instance, variables costs — that will achieve that target, the spokesman explained.

Other enhancements in version 3.4 include a broader range of defaults for reports and graphs, with an option for CRT screen output, and a new method of handling interactive terminal responses allowing user-defined abbreviations.

The Finar package is available for \$15,000 from the company at Suite 212, 132 Nassau St., New York, N.Y. 10038.

## 'Seed' DBMS Implemented For DEC VAX Environment

PHILADELPHIA — The Seed data base management system (DBMS) from International Data Base Systems, Inc. has been adapted to run in native mode on the Digital Equipment Corp. VAX-11/780.

Seed is a transportable Codasyl-type system. In addition to the VAX versions in native mode or RSX-11-compatible mode, it is available on Decsystem-10s and 20s and PDP-11s; Control Data Corp. Cyber and 6000 series mainframes; IBM 370s; Modular Computer Corp. IVs and Classics; and Z80-based microcomputers.

With so many implementations, Seed allows a user to develop an application on one machine — for example, a

PDP-11/34 — and then move it to a faster unit — perhaps a VAX — for production, a spokesman pointed out.

Seed has various options beyond the basic DBMS. Harvest is an English-like query language and report writer, while Sprout is a transaction processor enabling users to load data into their data base.

DBlook is an on-line interactive data manipulation language enabling users to browse through and update the data base as desired. Seed data bases may also be accessed — and updated — from both Fortran and Cobol programs, the spokesman noted.

For the VAX environment, Seed costs \$9,500. Harvest is available for \$7,200, Sprout for \$2,750 and DBlook for \$5,500. Monthly rental, educational and multiple system discounts are available, the company noted from Suite 701, 2300 Walnut St., Philadelphia, Pa. 19103.

## Texts Surpassed By A/V Courses

(Continued from Page 67)

modules concentrate on the IBM System 38, 8100, 5110 and 4300 and hardware selection procedures. ASI also plans courses on the IBM 8100 and 4300 series. Edutronics has a minicomputer/microcomputer course on its planned course list.

It does not seem likely that any of the three vendors will have their minicomputer courses ready for 1979.

ASI's video update series concentrates on topics of current interest. Dan McCracken has designed a course for that series entitled "The Application Development Process in the 1980s."

"Motivating Data Processing Personnel" is the title of a three-module video update recently completed by J. Daniel Couger for ASI. Its release is timed for the National Computer Conference this week, where the topic will be emphasized.

Although Lansford Publishing Company produces transparencies only, it has excellent visuals for more than 20 courses and course modules, as is illustrated by the accompanying artwork on Page 67 from the course on cybernetic systems.

A copy of the 12th Annual Guide to A/V Instruction in Data Processing is available for \$4 — \$5 if an invoice is required — from "Computing Newsletter," Box 7345, Colorado Springs, Colo. 80933.

Couger is professor of computer and management science at the University of Colorado in Colorado Springs.



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# Bank Blames Poorly Trained Personnel Phone Company Blasted for Net Snags

By John Whitmarsh  
CW Staff

MONROE, La. — Small town America may miss out on electronic banking services unless the quality of data communications circuits and the caliber of telephone company employees improves, a bank executive here warned.

"The technology to pull separately owned commercial banks into interstate networks is in place, and the hardware is top-notch," according to Rodney Johnson, senior vice-president of operations at Ouachita National Bank. "But when it comes to computer dialogue, computer technology is far in advance of the telephone company."

Ouachita National and two other Louisiana banks rely on dedicated leased lines to link their IBM 370 mainframes, IBM 3614 automated teller machines (ATM) and other correspondent banks in the statewide Liberty Network.

All three mainframes communicate with each other over a bisynchronous line, allowing Liberty cards held by depositors at each bank to be used interchangeably for withdrawals. Altogether, customers of 17 different banks have access to cash from 40 ATMs in northern and central Louisiana.

The Liberty system, nicknamed Libby, is one of the first electronic networks to link banks that are not jointly owned. Com-

puters at different government agencies have been talking back and forth for some time, but the concept has only recently taken hold in financial circles.

The Libby network is expected to cross state lines within 12 months, bringing banks in Arkansas, Mississippi and perhaps Texas into the system. Meanwhile, Johnson said, banks hoping to extend electronic services to smaller towns around Louisiana will encounter telephone personnel who have no experience with data communications circuits.

"In many cases, the phone company has no idea what we're talking about when we mention data circuits," Johnson said. "In general, we have a very serious problem with the phone lines not being of the quality that data communications demands."

For example, a CPU and its ATMs often are unable to handshake in the required time. Unless the mainframe and an ATM can exchange encrypted messages within 64 seconds, the ATM closes down for security reasons.

"We're closing down all too frequently," Johnson said.

## Phone Company Error

Poor training of phone company employees is another problem, Johnson said. Johnson was plagued with a bad circuit problem and had worked with the phone company for a number of months to improve the line. Frustrated, he called in an outside consulting firm to locate the problem.

"The consultants found that the modem on clear-to-send was supposed to be set for eight milliseconds, but it was actually set for 24 milliseconds," Johnson said. "This was a telephone company error, one that it had repeatedly told us had been checked and verified. It's not that we find a bad attitude with

(Continued on Page 74)

## Up to 16 Remote CRTs, Printers Tied by Controller to Series/1

BOULDER, Colo. — A controller that connects up to 16 CRT keystations and printers in satellite offices to an IBM Series/1 is available from Systems Design and Development Corp. (SDD).

Called DDP/1, the controller offers functional enhancements in remote job entry (RJE) as well as productivity aids that permit nonprogrammers to create new applications.

Satellite office workers can submit jobs from workstations to a host computer center over private or switched lines at speeds from 1,200- to 9,600 bit/sec., receive host output into disk files and then onto a printer; route files on the CRT before printing; and perform a variety of other DDP functions, SDD said.

Disk files may be accessed from workstations and printed on local or remote printers. Job status and output status at the other computer can be displayed and output can be released selectively to permit routing to the appropriate location, according to the vendor.

Files may be retrieved from other computers for inquiry and update by local and satellite office personnel, while diskettes can be exchanged between DDP/1 and IBM System/3, 5110, 3741, 370 and Series 30 processors as well as the Digital Equipment Corp. PDP-8.

The DDP/1, which appears to other computers as an IBM 3780, includes form definition tools for the creation of applications,

including multipage applications requiring up to 40 different formats. The DDP/1 also has provisions for automatic duplications, data checking, automatic field alignment and total checking.

Operators insert space for additional documents, delete the document, copy and access any of hundreds of formats, SDD claimed.

File inquiry and update features permit an operator to originate a partially completed form and permit others to refer to and update the form's information. The system also supports the upper and lower case features of the IBM 4798 and Hewlett-Packard Co. 2649 workstations.

The IBM 4978 redefine key is supported to permit single key stroke commands for multiple operations, according to the company.

Further information on the system is available from SDD at 2355 Canyon Road, Boulder, Colo. 80302.

## Directory Aids Network Planning

RAMSEY, N.J. — The *Private Line Rate Center Directory* has been announced by the Center For Communications Management (CCMI).

The reference book lists all U.S. mainland private line rate centers alphabetically by state and city. Each listing includes the AT&T-assigned vertical and horizontal coordinates, area code and multipoint private

line rate center classification.

Metropolitan rate area zones, Digital Data Service exchange points, "government only" rate centers and international boundary points are listed in the 286-page volume.

Copies of the *Private Line Rate Center Directory* are available for \$95 in North America or \$110 overseas from CCMI, P.O. Box 324, Ramsey, N.J. 07446.

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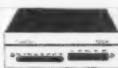


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## Courier 7700/7750 at Top Report Gives Details, Ratings of 277 CRTs

DELRAN, N.J. — A Datapro Research Corp. report on 277 alphanumeric CRT terminals is available with the results of a user survey covering nearly 20,000 installed terminals.

"All About Alphanumeric Display Devices" discusses the terminals' developmental progress in their decade-long history and offers guidelines for selecting a CRT terminal.

Specification charts summarize in detail the comparative characteristics of the 87 vendors' terminals, describing configuration options, compatibility, display organization, keyboard styles, auxiliary devices, transmission characteristics, pricing, availability and special features such as cursor controls

and editing features.

The terminals covered in the report all have a keyboard that can generate and monitor a full alphanumeric character/code set, can receive and send data via communications lines to a remote host computer and are made for general use in the U.S. and Canada.

### Courier Rated Highest

The terminals fall into three categories: dumb, smart and user-programmable. So-called intelligent terminals are not treated as a separate category "because the industry does not exhibit a consistent correlation between the name and the device functions," Datapro said.

Terminals were rated by users in the categories of overall performance, ease of operation, display clarity, keyboard feel and usability, hardware reliability, maintenance support and software and technical support.

The highest rated terminal was the Courier Terminal Systems, Inc. 7700/7750, with a score of 3.77 out of a possible 4.0; however, that terminal represented only three responses for 16 terminals.

Courier's 270/2700/2750, representing 1,206 terminals, picked up an overall rating of 3.13. The company's other terminals rated as high as that except for the E260 with 2.64.

The IBM 3277, with 6,032 terminals

represented in the survey, garnered an overall average of 3.21, while the 3278, represented by 1,457 units, averaged 3.24 out of the 4.0 possible.

Of all 9,330 IBM terminals graded by the surveyed users, overall performance was rated at a high 3.31. IBM picked up higher points than most other vendors for its maintenance service and software and technical support.

A buying guide gives potential users hints on how to buy a terminal based on what they need and spends a considerable amount of space on terminal characteristics, how they differ and how they can be connected to a computer system. A vendor list includes addresses and phone numbers for more information.

"All About Alphanumeric Displays" is available for \$12 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

## Datapro Updates Modem Report

DELRAN, N.J. — Datapro Research Corp. has published an updated report called "All About Modems" which provides details on 400 modem models from more than 50 vendors.

Along with a discussion of modem characteristics, the report includes a separate user reaction section that shows the degree of acceptance many of these products have received. More than 26 vendors were rated by more than 400 users representing an installed base exceeding 27,000 modems, with 11,743 from the Bell System.

Modems are grouped into eight categories: low/medium/high-speed, wideband, telephone couplers, short-haul modems and modem eliminators and line or cable drivers.

The report shows a general continuation of ratings patterns of usage and problem areas from last year's study, with the exception of complaints about line quality, which have dropped significantly, Datapro said.

"Diagnostic facilities" continue as the category with the lowest overall rating, receiving an average rating of 2.8 out of a possible 4.0.

Modems from Gandalf Data, Inc., Intertel, Inc., MI<sup>2</sup> Corp., Ven-Tel, Inc. and Western Union Information Systems were rated the highest in overall performance with either 3.8 or 3.9 scores, compared with an overall average of 3.5.

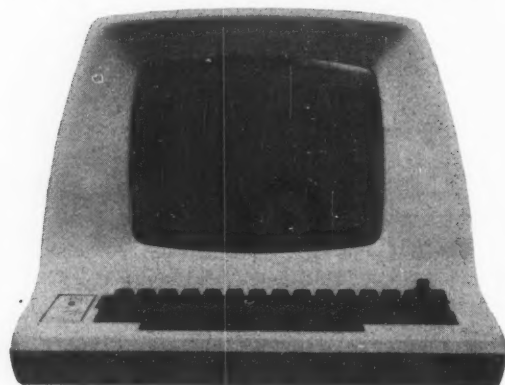
Diagnostic facilities were rated as high as 3.3 from Intertel, Codex Corp. and MI<sup>2</sup>. Bell was near the average with 2.7.

GTE Lenkurt, Inc. and MI<sup>2</sup> took 4.0s for reliability, followed by a 3.8 from Universal Data Systems, Inc. The average was 3.5.

MI<sup>2</sup> took the highest rating for maintenance service with 3.6 compared with the average of 3.1. MI<sup>2</sup> took the highest ratings through all four categories, although the ratings were based on only 10 user responses for 152 modems.

"All About Modems" costs \$12 from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

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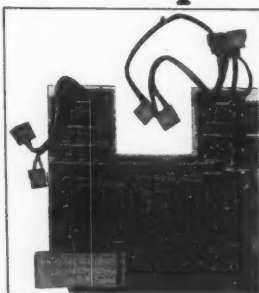
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## Unit Offered For Encryption

LOS GATOS, Calif. — A data encryption unit for point-to-point and point-to-host communications security is available from Data Security Systems.

Conforming to the data encryption standard promulgated by the National Bureau of Standards, the unit features RS-232C and current loop interfaces for configuration with a variety of terminals, modems and other peripheral devices.

A unit that communicates 110- and 300 bit/sec costs \$1,250; \$1,450 version functions at 110-, 300- and 1,200 bit/sec.

Data Security Systems is at Suite 1, 405 Alberto Way, Los Gatos, Calif. 95030.

## Phone Company Hit for Network Snags

(Continued from Page 69)

the phone company; we don't. But we do find poorly trained, poorly equipped people."

Ouachita National Bank set up the Libby network a few years ago when it linked its IBM 370/138 with IBM 3614 ATMs and eight correspondent banks around the state.

A second bank, Rapides Bank and Trust Co. in Alexandria, La., joined the system in July 1977. Rapides adapted Ouachita's software for use with its own IBM 370/135 and eight ATMs (also IBM 3614s).

Most recently, Shreveport National Bank of Shreveport, La., signed onto the system.

The Libby card holder, using his own bank's Libby machine, may make deposits or withdrawals, determine ac-

count balances, transfer funds from one account to another or make installment loan, credit card or Christmas Club payments. Card holders who use another bank's Libby machine are restricted to cash withdrawals by state banking regulations.

### Situation Not Perfect

In its two years on the Libby system, Rapides Bank and Trust has suffered fewer data communications problems than Ouachita National, but not everything has been perfect, according to Daniel Phillips, vice-president of DP at Rapides.

The line quality between his CPU and Ouachita's CPU is only fair to poor, which causes a high retransmission rate, Phillips said. But line quality between his IBM 370/135 and the

ATMs is better. One early problem with the Libby system was a reversed wire in the main office of the telephone company. Normally, a microload to an ATM requires three and a half minutes, but with the reversed wire it was taking 20 minutes.

Phillips added that he has had rather good success with local phone company personnel in Alexandria. For one thing, they were familiar with previous work at the bank, including the installation of an IBM System 7 audio response unit, which preceded the Libby automated tellers.

"IBM was rather surprised, as a matter of fact, that our ATMs came up as well as they did," Phillips said. "IBM said we did not suffer the communications problems it found in other places in this state and in other regions of the country."

### Threats to ATMs

The six ATMs in the Rapides network are directly attachable. They are hooked up to the 370/135 through an IBM 3705 network controller, a setup Phillips prefers to the optional IBM 3601 stand-alone computer. The number of ATMs that can be hung on each 3601 is limited, Phillips said, and Rapides would require multiple 3601s — something more to go down.

As with the Ouachita machines, the Rapides ATMs close down if the CPU cannot communicate with them within 64 seconds.

Phillips believes it would take longer than 64 seconds for someone to break into the network and to synchronize, even if he knew the keys and codes. "Most telecommunications networks like Libby are oversecured," he said. "Who would invest \$1.5 million in computer equipment to steal the money out of an ATM that holds only \$30,000?"

Dynamite and card thefts are more realistic threats to ATMs, he added.

### Magnetic Code for Check

Liberty cards have magnetic coding on the back that can be read by a magnetic reader inside each ATM. The ATM has a fair amount of intelligence, and it uses part of the magnetic code to double-check the user's personal identification number (PIN).

"The ATM assembles an entire transaction before it transmits back to the CPU, and that cuts down on our line time considerably," Phillips said.

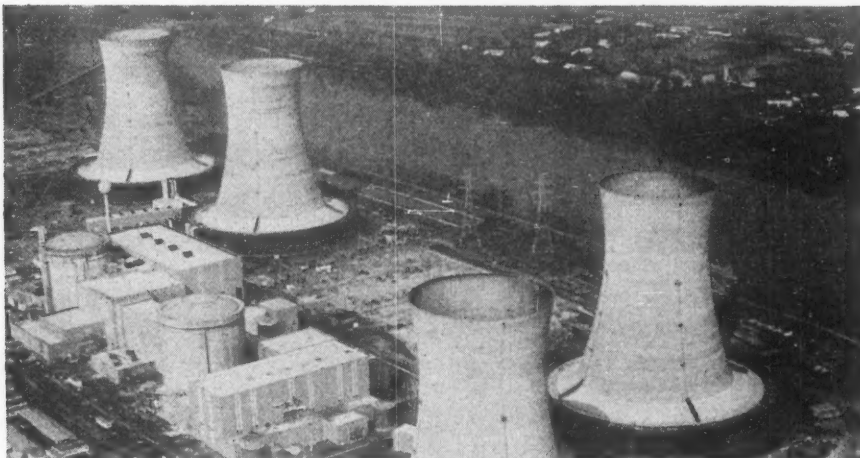
Some systems require "host PIN checking" where each PIN is sent back to the CPU for validation.

"Host PIN checking builds up line traffic," Phillips said. "A single-loop telephone line which we use cannot handle that much multiple transmission." In one month alone, nearly 12,000 transactions are handled by a single Rapides machine.

Rapides uses a single-loop telephone line with a synchronized data link protocol that simulates a loop, Phillips noted. Each ATM is a station on the loop, answering only those messages that carry its identification number.

Charges for transmission time are by the mile, and those charges average about \$3/mile monthly for Rapides. The bank's most remote ATM is 70 miles from the bank's CPU, so phone charges are calculated up to that point. But Rapides hooks six ATMs on the single loop, and charges are divided up among those units.

## Billings Computer—when performance is critical

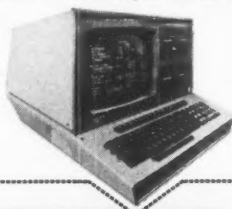


When Billings was called in by the federal government to assist at Three Mile Island, sophisticated computer data collection formed the basis of its recommendations in dealing with a potentially dangerous hydrogen bubble. Plotting variables like temperature and pressure against time, Billings worked 'round the clock' to devise a computerized monitoring system to provide valuable information to the crippled reactor. In the face of calamity, Billings' performance was critical.

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See Billings' process control hardware in action and a scale model of the Three Mile Island reactor at the upcoming NCC show in New York City.



# I. Magnin Converting 24 Stores Specialty Chain Finds POS More Than Stylish

Special to CW

SAN FRANCISCO — When I. Magnin began considering point-of-sale (POS) data collection, its primary goal was improved customer service combined with hard dollar savings.

For more than a century, I. Magnin has operated high-fashion women's specialty shops that also carry gifts and men's and children's clothing.

Besides stores throughout California, the company is represented in Portland, Ore.; Seattle; Phoenix; Chicago; and in suburban Washington, D.C. In the second half of this year, a 25th store will open in suburban Chicago's North Brook Shopping Center.

Before I. Magnin began moving into the world of POS data collection, all of its stores relied upon hand-written sales checks and pneumatic tubes for making change and securing credit authorizations.

For the latter, some of the larger stores had their own CRT terminals which were connected by direct telephone line to the CPU at the administrative center in downtown San Francisco. Other stores in the Bay area phoned in their queries, while the more distant ones used microfiche files that were updated once a week.

"This is still the system used by the 20 stores that are not yet on the POS network," Dan Tilles, director of information systems, said. "Those with the NCR Corp. 2151s, however, have their credit inquiries routed directly to the

disk drives of our mainframe.

"The new system is not even apparent to customers, because the checking is done as part of 'ringing up' the sale, and it's much faster than the old method. These features are distinct gains in terms of customer service."

Currently, four of the 24 I. Magnin stores are linked to an NCR electronic sales terminal network that does everything from keeping track of sales to monitoring inventory flow, Tilles pointed out. The other major outlets will be converted before Christmas, and the remaining, smaller ones will be converted by the latter part of 1980.

## Pluses for Customers

Customer benefits of the system include faster preparation of sales checks and automatic, electronic calculations for price extensions, discounts and sales taxes, as well as alphabetical descriptions of each item bought.

"The legibility of hand-written sales checks often left much to be desired," Tilles said. "In addition, we had two areas for errors. One was the arithmetical computations done by sales clerks. The other was the keypunching of the sales data later for input to the computer."

Elimination of the last activity has produced the hard-dollar cost justification that I. Magnin's parent, Federated Department Stores, insisted upon. As a fringe benefit, Tilles added, buyers now get accurate, audited sales infor-

mation on a day-after-the-fact basis, not with the two- or three-day lag that prevailed before.

"We can also get a flash sales report at any time of the day at either the store or headquarters level," Tilles noted.

## Inventory Data

Yet another advantage of the new system is the way it speeds dissemination of store inventory information. This is particularly important for I. Magnin because not all stores, especially the smaller ones, carry every style in every color and size available.

So when a store has a request for an item it doesn't have on hand, it needs to know as quickly as possible the location of the nearest store which does have what the customer wants. Such inquiries are made on-line to the main computer, either via in-store CRTs or by phone.

The data base for determining the response is compiled, in part, from input of an 8-digit code which is printed by NCR 399 minicomputers on the unique I. Magnin price tag. In effect, the code is a short-form SKU identifying vendor, style, size and color.

Salespeople in stores with the 2151s index the code manually as part of each transaction. This ensures that their inventory records are updated that same evening. Input of such data from other stores, however, must still be keypunched, an intermediate step

which delays updating.

When the POS network is completed, Tilles said, the electronic terminals will be used to record store transfers in and out directly. This will eliminate yet another intermediate preparation of input data and will enhance customer service even more.

I. Magnin began its POS conversion at the Vallco Shopping Center store in the Bay area. That first installation was completed in June 1977. In August that same year, the company opened a new outlet with terminals at the South Coast Plaza in Newport Beach, Calif.

The third installation was completed for the August 1978 opening of the White Flint store in suburban Washington, I. Magnin's first outlet in the East.

Then in November 1978, the company reopened its remodeled store with POS terminals in the Fashion Square Shopping Center of Sherman Oaks, Calif.

## Three Vendor Candidates

In selecting a hardware vendor, I. Magnin narrowed its choice to three from a list of authorized manufacturers prepared by Federated's headquarters in Cincinnati, Tilles recalled.

In explaining why NCR was chosen, he said the system of one competitor would have required a costly upgrading of the mainframe, while that of the other would have required in-store  
(Continued on Page 82)

Considering what we're doing here—controlling the nation's largest public packet communications network—our TYMNET Network Control Center in California looks so ho-hum that your most noteworthy reaction would probably be a healthy yawn. But that's what's so interesting, even fascinating, about this photograph—it takes so little apparent effort to run this massive network when you know what you're doing.

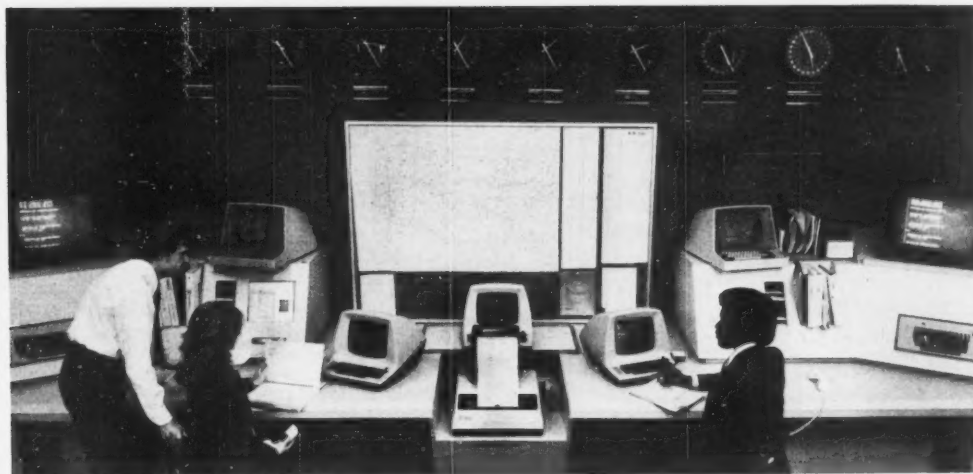
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## Terminal Compatible With VT-100

PENNSAUKEN, N.J. — Datamedia Corp. recently unveiled its Series 80 line of terminals with a unit that reportedly offers full compatibility with Digital Equipment Corp.'s VT-100.

Called the DT80/1, the terminal can interface with a printer in three different modes — as a printer controller, on-line as data comes in and as a source for feeding data from the screen directly into the printer, Datamedia said.

Screen capacity is 24 lines by 80 or 132 characters. A detachable typewriter-style keyboard features fixed and settable tabs

and bidirectional scrolling.

The microprocessor-based terminal houses an LSI CRT controller with two serial I/O ports, operating asynchronously either with RS-232C or 20mA current loop, with communication speeds up to 19.2K bit/sec, the company claimed.

Self-diagnostics and a CRT saver are incorporated into the DT80/1, as are LED indicators for status indications and underline, blink and dual intensity facilities.

The system is priced at \$1,795 from Datamedia, 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

## Memorex Enhances 1270 Control Unit

SANTA CLARA, Calif. — Memorex Corp. has announced major enhancements to its Model 1270 terminal control unit, including an intelligent line adapter (ILA) feature.

The ILA gives Memorex's hard-wired front end the type of system flexibility usually available in fully programmable communications control-

lers, a spokesman claimed.

An ILA-based high-speed asynchronous line adapter allows the 1270 to support low-cost asynchronous ASCII CRTs at switch-selectable speeds up to 9,600 bit/sec without synchronous modems or other clocking devices such as modem eliminators, he added.

An enhanced alternative to the IBM 2701, 2702 and 2703 control units, the 1270 allows up to 96 lines to be installed in almost any asynchronous or synchronous combination, Memorex said.

Delivery of the enhanced 1270 is scheduled for the fourth quarter. The cost of the unit, which supports up to four lines, is \$100/mo over a one- or two-year term or \$3,600 when purchased.

Support for the Sabre and the Society for Worldwide Interbank Financial Telecommunications (Swift) networks was also announced.

Sabre code support allows the attachment of up to 48 full-duplex lines for connection to the IBM 1006 terminal interchange. It was designed as an alternative for airlines and financial institutions using Par/Ipars software.

Sabre code can be leased for \$500/mo, plus \$65/mo for four duplex lines or purchased for \$18,000 plus \$2,340 for four duplex lines. The Swift feature is available for \$35/mo or \$850 if purchased.

Memorex is at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

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- Remote Editing Commands
- ✓ Standard or Reverse Video
- ✓ Programmable Key Switch Audio Feedback
- ✓ VT-52 Compatibility
- ✓ Clear Screen
- ✓ Clear Foreground
- Clear to End of Line
- Clear to End of Screen (background spaces)
- Audible Alarm
- Backspace
- ✓ Keyboard Lock
- ✓ Keyboard Unlock
- ✓ Insert Line
- ✓ Delete Line
- ✓ Field Tab
- Column Tab

Enter/Exit Hold Screen Mode

Enter/Exit Alternate Key Pad Mode

Enter/Exit Graphics Mode

Send Terminal ID

✓ Set/Reset Audio Key Switch Feedback

Cursor Address (XY)

✓ Incremental Cursor Control

✓ Read Cursor Address

Home Cursor

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## Digitronics Units Get Interfaces

CUMBERLAND, R.I. — RS-232C interfaces costing \$125 to \$500 are now available for paper tape readers, punches and combination units from the Digitronics Division of Comtec Corp.

In addition to the normal half-duplex serial interface, the interface includes 20mA and 60mA current loops, supports X-on and X-off and will accept either externally or internally generated drive signals, Digitronics said.

Digitronics is at 53 John St., Cumberland, R.I. 02864.

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## For IBM 3275, 3277

## Program Trains Operators

ELK GROVE VILLAGE, Ill. — An audiovisual on-site training program for showing operators how to use function keys on the IBM 3275 and 3277 terminals has been announced here by Advanced Systems, Inc. (ASI).

The Function Key program is supposed to help experienced operators improve function key performance and teach those operators with basic alphanumeric keyboard skills to use the function keys with speed and accuracy, a spokesman said.

The program is billed as a logical extension of ASI's Keytrainer system,

which was designed to build or improve keyboard skills. The Keytrainer program has been used to train both experienced and neophyte keyboard operators.

An audiovisual unit, headphones and an exercise manual come with the program. Personnel can train alone, learning or improving their function key skills at their workstations without disturbing other operations, ASI said.

The Function Key Program can be purchased for \$3,500 from ASI at 1601 Tonne Road, Elk Grove Village, Ill. 60007.

## Common Carrier Services Expected to Go Up in '79

RAMSEY, N.J. — Business telecommunications users can expect to pay 10% more for common carrier services in 1979, on top of the 13% increase in the telecommunications price index posted last year.

The increase was forecast by the Center for Communications Management, Inc. (CCMI) located here. The index is a composite of all telecommunications expenses — local, statewide and interstate — experienced by the average business user.

The company contended that its index is more accurate than carrier-published average rate increases because it includes "usage sensitive" elements such as long-distance tolls.

Describing how the user can apply the price index to the budget planning process, the report features an annual forecast of events likely to affect the business telecommunications user this year. An overview of the struggle between the Federal Communications Commission and AT&T over the Wats service is included. CCMI concludes that although Wats is still an essential service, it "is destined to become a museum piece."

Issues are available from CCMI at \$25 a piece. The single issue price may be applied to the regular \$125 subscription price for CCMI's annual report. CCMI can be reached at P.O. Box 324, Ramsey, N.J. 07446.

## IBM Users Get Sycor Tie

NEW YORK — Computer Dynamics, Inc. has announced the availability of the Basic Telecommunications Access Method (Btam) program that controls the transmission of data between IBM 360 and 370 CPUs and remote Sycor, Inc. terminals.

A multiline facility, the program is said to achieve higher rates of data

throughput than Sycor-to-Sycor transmission or alternative methods of handling communications.

## Program in Host

This Batch Communications Program (BCP) receives and sends data between IBM computers and Sycor 340, 350 and 440 terminals. The program resides in the host system and operates under all versions of IBM operating systems.

On the Sycro side, the program communicates with the Sycro BSC unattended transmission program. The BCP will send up to six files in either direction between the remote terminal and the host.

The BCP costs \$8,000 from Computer Dynamics at 10 E. 39 St., New York, N.Y. 10016.

## Zeta Controller Gets RS-232 Interface

CONCORD, Calif. — An RS-232 communications interface has been added to Zeta Research, Inc.'s 6300 off-line magnetic tape controller, allowing the user to write to tape remotely via the asynchronous interface without removing or transporting the tape.

In addition, transmitted data can be plotted while being captured on tape, or go only to the plotter providing on-line controller capabilities at from 110 to 9,600 bit/sec, Zeta said.

The A-39 option is available for \$1,000 from Zeta Research at 2300 Stanwell Drive, Concord, Calif. 94520.

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## Vendor Also Adds Workstations Wang WPs Gain Communications Controller

LOWELL, Mass. — Wang Laboratories, Inc. has announced multipurpose communications controllers for its word processing (WP) systems and a pair of workstations, one each for Wang's WP and office systems.

The controllers reside in the WP systems' workstations, permitting them to act as interactive or batch terminals as well as input devices. Systems equipped with the controllers can communicate with comparably equipped Wang word processors and computers or compatible systems, Wang said.

The operator can select the desired telecommunications activity from the main menu, moving to either interactive time-sharing or remote job entry

mode.

The controllers were designed for the stand-alone Model 5 WP system and for the workstations of the models 20, 25 and 30. They permit the systems to communicate as asynchronous interactive Teletype-type or IBM 2741-type time-sharing terminals, operating at speeds up to 1,200 bit/sec.

The systems can be used in bisynchronous mode for batch processing at speeds up to 2,400 bit/sec. They are compatible with IBM 2780 and 3780 protocols.

The controller for the Model 5 is priced at \$1,000, with a monthly rental charge of \$37.50. The equivalent controller for the models 20, 25 and 30

costs \$1,500 or \$56.14/mo.

Wang also released two workstations with increased functionality and more memory, one for the WP series and the other for the office information system series.

The Model 5536-1 is a 1K-byte workstation with horizontal scroll for use with the models 20, 25 and 30.

Cost is \$4,000, with a monthly rental of \$150.

The Model 5536-2, for use with the office information systems models 130 and 140, includes the horizontal scroll and 32K bytes of memory. It is priced at \$4,300 or \$161.25/mo.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.

## Dual-Speed Modem Bows

ROCKVILLE, Md. — A dual-speed modem with an automatic answer option that automatically recognizes and adjusts to the incoming data rate has been introduced by Penril Corp.'s Data

Communications Division.

The Model 300/1200 modem provides Bell 212A compatibility at 1,200 bit/sec through synchronous or character-synchronous operation. It has received Federal Communications Commission registration as a two-wire, full-duplex dial line modem, Penril said.

Working as two modems, the unit provides originate/answer transmission and reception of serial binary data over switched or leased lines. Integral diagnostics provide self-test, analog loopback and remote digital loopback test modes.

The Model 300/1200 uses an active filter network to ensure accurate data transmission over inferior telephone lines, a spokesman noted. Eight status indicators on the modem's front panel show current network conditions.

User control over transmitter/receiver connections, speed selection and diagnostic tests are achieved through five front-panel switches. Sixteen user-selectable options permit field modification to meet specific requirements, the spokesman said.

The modem is available as a stand-alone unit; a 19-in. rack-mount version will be available in September. It costs \$850, Penril said from 5520 Randolph Road, Rockville, Md. 20852.

## Patch Modules Aid Analysis

ALEXANDRIA, Va. — The Data Patch series of modules that provides access to the data circuits at the RS-232C/V.24 interface has been introduced here by Atlantic Research Corp. (ARC).

The modules allow access to all 24 connectors in small, modular units to connect or "patch" modems, multiplexers, terminals and computers where rapid service and diagnostic testing are needed.

The Data Patch modules are said to help organize the communications facility by bringing all data circuits to a single location where they can be labeled, simplifying system maintenance.

The DPS-4 system, the most recent addition to the Data Patch line, is a 16-channel fallback switch with patching capability. RS-232/V.24 patching, status and alarm displays and A/B fallback switching are now contained in one display for \$4,700.

The same system without the alarm costs \$4,300. A power supply is required, capable of running five DPS-4s, for \$330.

ARC is located at 5390 Cherokee Ave., Alexandria, Va. 22314.

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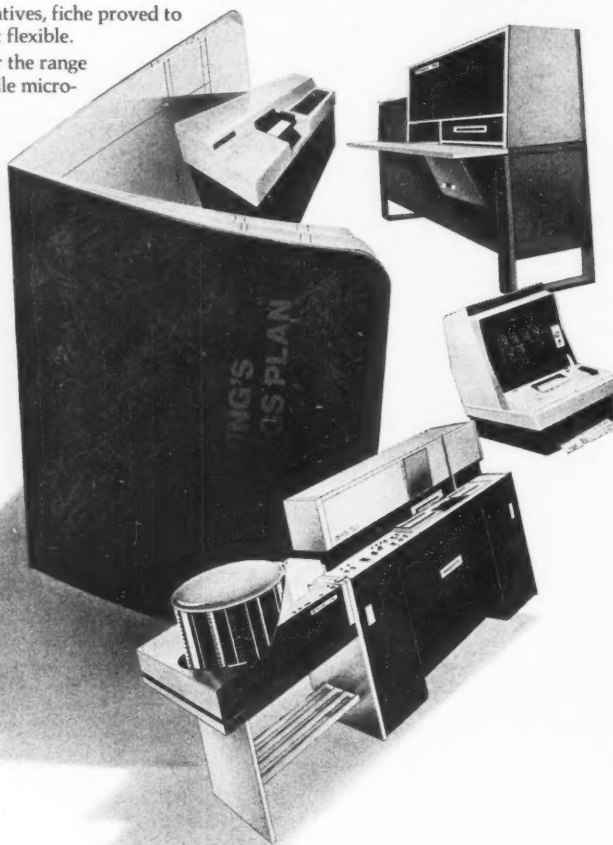
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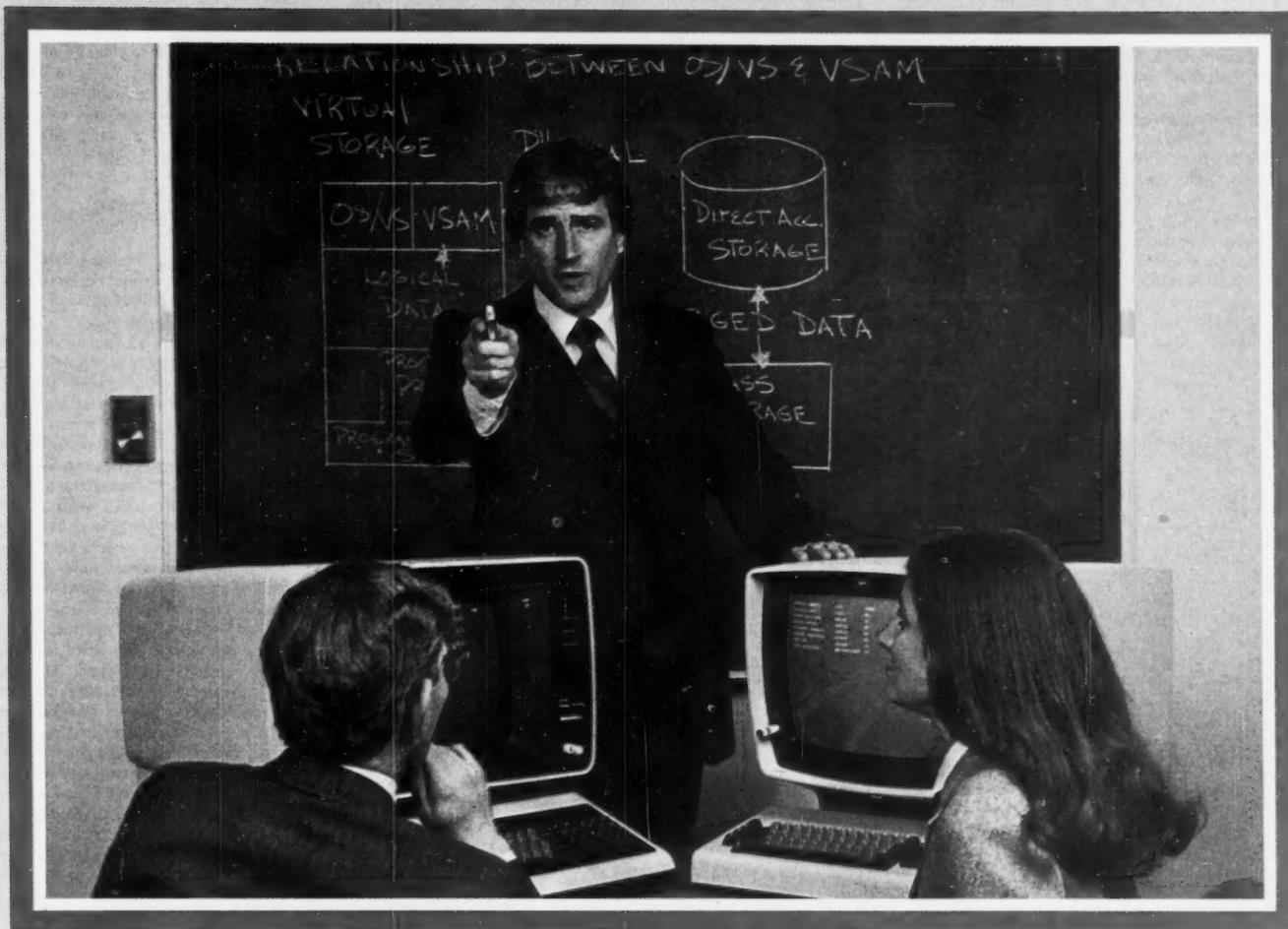


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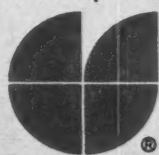
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# National Semi Enhances Datachecker POS Line

SANTA CLARA, Calif. — Three products and applications were recently added to National Semiconductor Corp.'s Datachecker point-of-sale (POS) product line that are meant to provide better control of store operations, labor management and employee time and attendance information.

The Management Information Processing (MIP) system has added an MIP File, which reportedly makes it possible for store management to add and organize special interest files, reformatting them in a useful configuration and retaining them for historical management reporting and analysis.

The MIP language and file are standard with Datachecker register software, the company said.

The front-end labor management

system was designed so a store manager can efficiently schedule cashiers depending on the system's forecast of the volume of business that can be expected in predefined segments of the day.

It can also take information from the POS system about checker performance and turn it into an employee effectiveness rating, according to the company.

By combining that information with the store's business forecast, cashiers can be properly scheduled for all parts of the day, the company stated.

The time and attendance system utilizes a wall-mounted terminal designed to replace a time clock. Using employee clock-in and clock-out information as well as other data in the sys-

tem, it can prepare reports for store management.

The data files contain all the information necessary for payroll, which can be transmitted to a host computer for processing, management reporting and feedback to the store, the manufacturer indicated.

The labor management system sells

for \$3,000.

The time and attendance system costs \$852. Entries can be made manually, but a magnetic card reader is available for \$420. Memory, logic and an interface cost an additional \$750.

The Systems Division of National Semi is located at 1130 Kifer Road, Sunnyvale, Calif. 94086.

## Terminal Suits Novices

MARYLAND HEIGHTS, Mo. — An interactive desktop terminal for order entry, inventory control, check cashing and other uses has been announced by Interface Technology, Inc.

The Model 736 was reportedly designed for use by operators with little

or no previous DP experience. Users can order the terminal with custom operator guidance displays and function keys, the company said.

The 20-key unit can also be tailored for work-in-progress reporting, automated warehouse control and credit checks and other applications that require prompting and verification. It can be ordered with a hand-held wand for reading tags and other documents carrying OCR-A data characters.

The terminal comes with standard 110- or 300 bit/sec transmission rates and can be specially ordered to run at 1,200 bit/sec as well.

Eight prompting messages can be selectively lighted to guide the operator through data entry operations. LED numeric displays can be ordered with four, eight, 12 or 16 digits, each .3 in. high, with custom display characters available, according to a spokesman.

The unit's 38 ASCII characters consist of 19 from the basic keyboard and 19 more generated by using the shift key.

The terminal offers four-wire full-duplex or two-wire half-duplex serial asynchronous operation and a 20mA current-loop interface. It also meets RS-232C/CCITT V.24 specifications, Interface said.

Parity generation and detection is user-specified and field-settable, and custom keyboard formats and engraved keys are available.

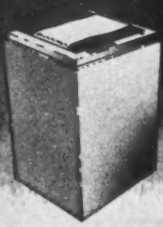
A basic 736 terminal sells for less than \$600, the company said from 100 Progress Pkwy., Maryland Heights, Mo. 63043.

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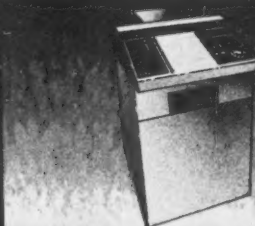
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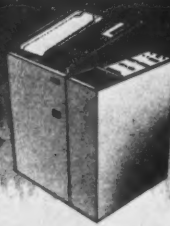
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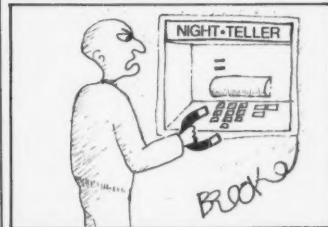
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## Between Transportable Earth Stations

# RCA Service Gives Users 56K-Bit Data Stream

PISCATAWAY, N.J. — A dedicated data service called 56 Plus that provides one or more 56K-bit data streams to high-speed data users between dedicated earth stations has been announced by RCA American Communications Inc.

If an existing RCA earth station is near the user's plant locations, the user can utilize it. Otherwise, a dedicated earth station can be installed on user

premises, equipped to provide up to six full-duplex 56K-bit data streams with the capability to handle digitized voice, RCA claimed.

The stations are compact and transportable and utilize five meter antennas.

### Minimum Preparation

Minimum site preparation is required, the company said.

They were designed for unattended operations.

Sites and commercial power to run the stations is generally provided by the user. Normally, no installation costs are involved, and the vendor will act as the licensee of the earth stations and make all necessary arrangements for filings and frequency clearances.

RCA, which provides voice,

television and data communications to business, government and new media via two high-capacity Satcom satellites orbiting above the equator, provides service between dedicated sites for each duplex 56K-bit circuit for \$2,000 plus a monthly lease of \$3,500 for the earth station.

If the customer is close enough to use an existing sta-

tion link or if the service goes between two existing stations, the cost is lower, a spokesman noted.

Minimum time of station use is five years; early transmission of the service requires a substantial liability fee, he added from RCA American Communications at 201 Centennial Ave., Piscataway, N.J. 08854.

## Teleprinter Built For TWX Use By Businesses

NORWALK, Conn. — A microprocessor-controlled desktop terminal that offers increased data storage and simplified message handling for business communications on the Western Union TWX network has been announced by Trans-Lux Corp.

The Trans-Lux teleprinter is equipped with a standard four-row, typewriter-style keyboard that eliminates the need for special training, according to a spokesman. Messages can be prepared and edited at speeds up to 300 word/min and errors can be erased by overtyping.

The operator can prepare, edit and transmit messages under the guidance of status lights. Insertions of characters, words and whole lines can be made at any point, Trans-Lux said.

The teleprinter stores more than 1,300 words of incoming and outgoing messages separately; the operator can query the unit to learn how much memory is left. An auto-dial feature stores up to 29 TWX numbers.

The unit uses impact paper and can make up to three duplicate copies. Other features include a Mailagram key to procure electronic mail service and a key that provides a direct line to weather, news, financial, stock and commodity reports, Trans-Lux stated.

The TWX terminal can be purchased for \$2,765 or leased for \$87/mo on a one-year term from Trans-Lux, 110 Richards Ave., Norwalk, Conn. 06854.

## Terminal Stand Available for \$89

UPPER SADDLE RIVER, N.J. — Precisioncraft Corp. has designed a terminal stand to be used with most available printing and CRT terminals.

The top of the stand measures 24 in. square. It is recommended that the terminal be bolted directly to the stand.

The stand costs \$89 from Precisioncraft, 346 Rt. 17, Upper Saddle River, N.J. 07458.

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North Star has quadrupled the disk capacity of the Horizon computer but prices have increased a modest 15 percent. On a dollar per byte basis, that's a bargain that is hard to beat!

The proven North Star disk controller was originally designed to accommodate the two-sided drives. North Star DOS and BASIC are upgraded to handle the new capacity, yet still run existing programs with little or no change. Of course, single sided diskettes are compatible with the new disk system.

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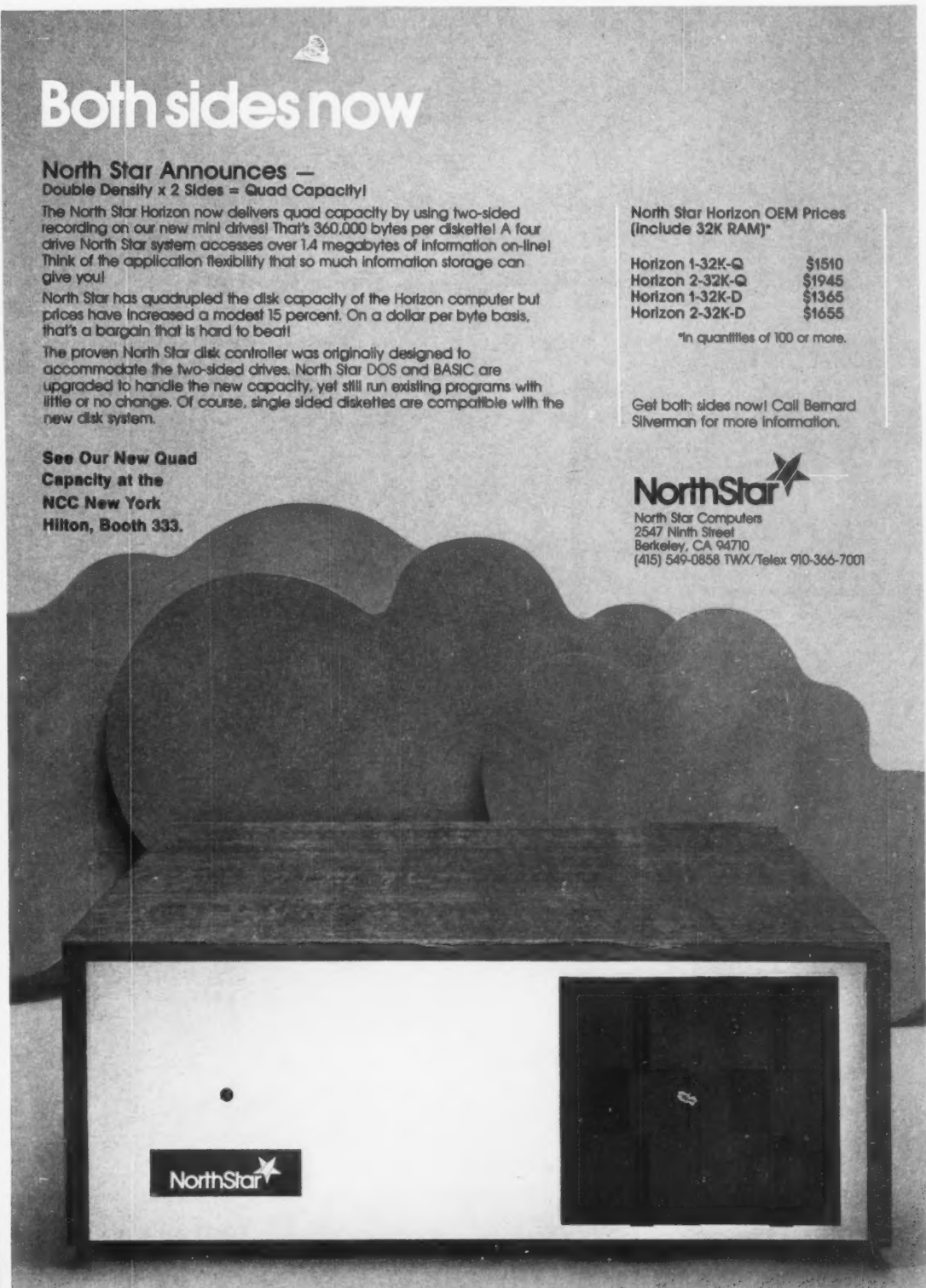
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# I. Magnin Finds POS More Than Fashionable

(Continued from Page 75)

minicomputers, one at each site for operations and another for backup.

"We also questioned whether the third vendor could have provided the nationwide service and systems support we require," Tilles said. "With NCR, there was no such question."

With respect to training, Linda Yim, the I. Magnin POS coordinator, noted that most of the company's salespeople had never even operated an electromechanical cash register. Three four-hour classes were scheduled over a period of several days, with extra sessions for those who needed them.

"Operation of the terminals is picked up fairly easily," she said, citing the extensive lead-through instructions provided by the 2151s.

Although the 2151s provide for automatic tax computations from up to four internally stored tables, I. Magnin customarily uses only three, relying upon printed schedules beyond that.

"You have to remember that we operate in six states," Tilles said. "For 'sends' we have to use the tax schedule of the receiving state."

"Not uncommonly, there are three such schedules. Here in California, for example, we have the regular 6% state-wide levy, the extra .5% levy for the Bay Area Rapid Transit up here in San Francisco and the adjoining counties and the extra .5% in Santa Clara County."

In each store on the POS network, the terminals are wired directly to an NCR 751 data concentrator with tape

cassette backup. The 751s communicate the details of every transaction, via leased telephone lines, to an NCR 725 minicomputer at the San Francisco administration center.

There the data is recorded on magnetic tape for end-of-the-day input to the mainframe and on magnetic disk for backup. Before the tape is removed each evening, the 725 polls the cassette recorders of the 751s to pick up any data that has not been transmitted in full.

## Credit Inquiries

As mentioned earlier, the minicomputer routes credit inquiries to the mainframe's disk files. If there is a problem with an account, the terminal signals the salesperson with a code

number on the CRT screen.

Simultaneously, the credit office in the San Francisco administration center is alerted by a printout on its NCR 260 thermal printer.

"The people there weigh the matter and come to a decision," Tilles said. "That is communicated to the store via CRT terminal and printed out on the store's 260."

"Then the salesperson phones the office in response to the code displayed on the terminal. Sometimes authorization is given to go ahead with the sale and sometimes the customer is asked to visit the office. In any case, the whole process takes only moments and represents a big improvement over the old system."

According to Tilles, in time to come, headquarters messages such as price change notifications will be "broadcast" to the stores via the 260 thermal printers. Such communications are now made by mail.

He said the store plans to use the terminals to compile salesperson productivity and staffing requirement reports. "The data is already being collected by the computer. All we have to do is write a routine to extract it."

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Dr. Alec Grimison,  
Physical Sciences Support Coordinator,  
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### High Performance

According to Alec Grimison, applications such as a Monte Carlo simulation in statistical mechanics, when programmed in the array processor assembly language (APAL), have run on the FPS AP-190L from 2 to 3 times faster than on the IBM 370/168.

### User Benefit

The result of this combined high performance and low cost of the FPS AP-190L Array Processor is a reduction in costs to system users at Cornell by as much as 95-99% — that's 20 to 100 times more processing for their computing dollar."

The array processor on the Cornell IBM 370/168 is available nationally and internationally via the Tymnet and Telenet Telecommunications networks.

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The FPS AP-190L is supplied with an extensive library of scientific routines, complete program development capability in both array processor assembly language (APAL) and FORTRAN, an off-line simulator, and a complete hardware/software interface for the IBM 370.

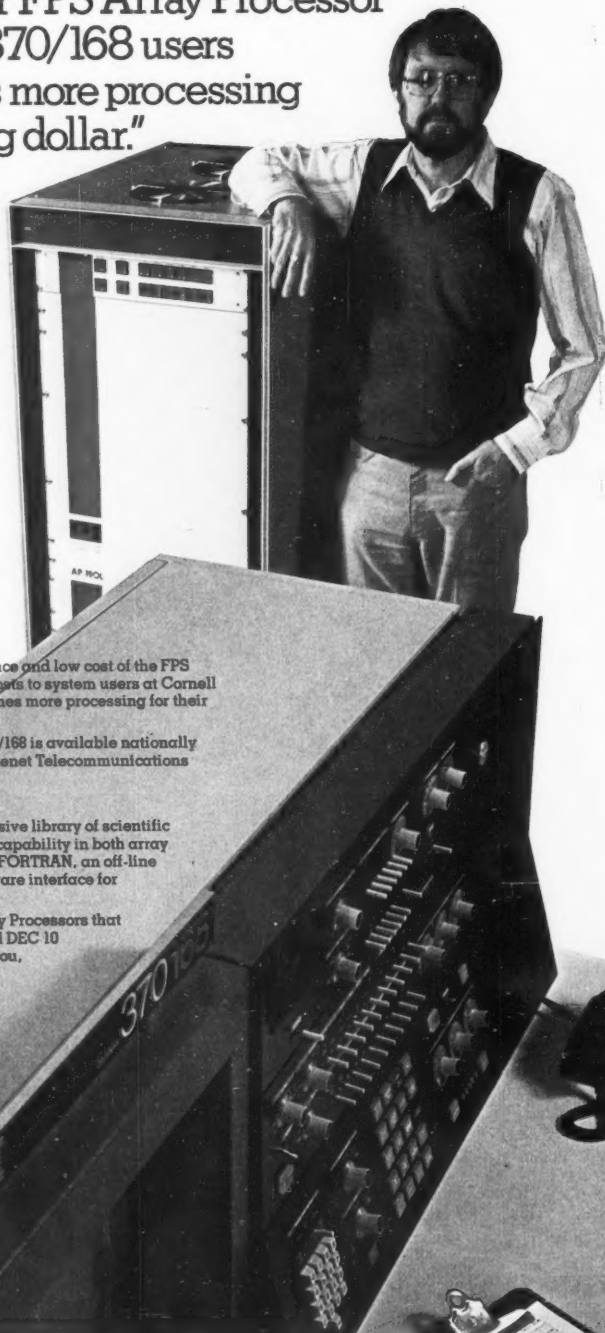
For more information on FPS AP-190L Array Processors that interface to IBM 370, 303X Univac 1100, and DEC 10 systems, call the FPS field office nearest you, or contact Floating Point Systems directly.

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## Comet Users Hold First Meet

NEWTON, Mass. — The Association of Comet Users, an organization formed to exchange information about Computer Corp. of America's (CCA) minicomputer-based electronic mail system, held its first organizational meeting here in April.

It was attended by more than 50 office-of-the-future planners representing 21 companies in North America, a CCA spokesman said.

At the meeting, CCA announced the availability of word processing capability for Comet. The new configuration is said to combine the advantages of advanced off-line word processing and communications capabilities.

Both Comet and word processing systems are offered on a subscription basis.

Further information on the group is available from the Director of Communications, Technology Division, Computer Corp. of America, 575 Technology Sq., Cambridge, Mass. 02139.

## Large Networks Seminar Topic

NEW YORK — Large telecommunications networks will be the focus of a two-day seminar to be held here at the Waldorf Astoria on June 26 by Telco Research Corp.

The telecommunications consulting and computer software firm will present "Large Network Dialogue: Contrasts and Comparisons," geared to managers who have direct responsibility for telecommunications budgets of at least \$100,000 a month.

The conference fee is \$295 for individuals and \$225 for additional representatives from the same company. Further information is available from Telco Research Corp., 2313 Hillsboro Road, Nashville, Tenn. 37212.



## Adds 25 Terminals Bank Steps Up Remote Service in Supermarkets

By a CW Staff Writer  
LOS ANGELES — One of the first savings and loan associations to install remote banking convenience centers in supermarkets throughout the State of California is adding more of them.

California Federal Savings and Loan Association (Cal Fed) has installed Addressograph-Multigraph Corp. Amcat terminals — now under the control of Datatrol, Inc. — at 25 Vons Markets and Hughes Markets in southern California. Seven more will be added by the end of the month, according to Cal Fed systems analyst Alex Benson.

The Amcats handle cash and check deposits, withdrawals, purchases and check cashing up to \$300 on the

"cleared" funds in customer accounts. They are available seven days a week between 8 a.m. and 10 p.m.

The terminals are direct multi-dropped devices that feed into a Data General Corp. Nova minicomputer over eight low-speed dedicated leased lines. The mini acts as a switching device from the markets to Cal Fed's two Univac mainframes, a Model 494 host processor and an 1100/80. "We're in the process of converting to the 1100/80," Benson said.

The Nova system monitors the network and reformat it in teller terminal-compatible format for transmission to the mainframe. The mainframe then "sees" the Amcat terminal as just

another one of the banks' Bunker Ramo Corp. terminals. When funds are transferred between a market and the savings and loan association, the bank credits to the customer's account and debits the merchant's account.

### Clerk Involvement

The terminals, located behind courtesy counters, are run by clerks who take the customer's encoded plastic card and handle the transaction the way a teller would, according to Bob Webber of the savings and loan company.

The clerks key in the transaction and handle the money. The Amcat terminal then prints out a descriptive statement

that shows where the transaction occurred, the type of transaction and its amount. The customer received a line item account of each transaction performed, Benson said.

At present, Cal Fed maintains hours that match the supermarket's hours. An automated teller machine system that will operate around the clock is in the works, however.

Cal Fed would like to introduce the automatic teller and a new savings plan "a few years down the road," according to Benson.

Cal Fed would like to move into other market areas, Benson added. "We think both the city and suburban areas can benefit from the services."

## Bunker Ramo Users Group Established

By a CW Staff Writer  
PHOENIX — Users of Bunker Ramo Corp.'s BCS 90 banking systems recently formed a users group to provide a forum for information exchange and to communicate the group's needs to the manufacturer.

Organized by the Arizona Bank, headquartered here, the group plans to hold its first annual meeting in San Francisco during September.

Known as the Bunker Ramo Automation Group (Brag), the group was formed by 25 members from 14 banks because the company "was becoming a force in automating the teller line area," Arizona Bank President Roger Schindler said.

The group was needed because "one voice crying in the wilderness doesn't get a lot," he said.

The Arizona Bank had done a 600-page study of on-line banking and wanted to share some of its findings with other users. Schindler wrote to some of the Bunker Ramo bank system users and asked if they wanted to establish some sort of a user group to share ideas.

Schindler would like to see the group meet at least twice a year, and there are plans for a newsletter and round robin phone conversations to resolve problems as they crop up, he said.

Brag is split into three committees. The software group will work to establish a member-generated code so that software use standards can be developed. "Why reinvent the wheel?" he asked. The committee will also evaluate performance and address major software problems.

The hardware group will evaluate equipment and work to make suggestions for change and to bring user difficulties to the vendor's attention.

The applications group will address future enhancement and current problems in operations, documentation, implementation and training. It also intends to set up a "need" survey to define "what we all would like to see in a product," Schindler said.

More information on Brag is available from Schindler, Arizona Bank, 2727 S. 48th St., Tempe, Arizona 85282.

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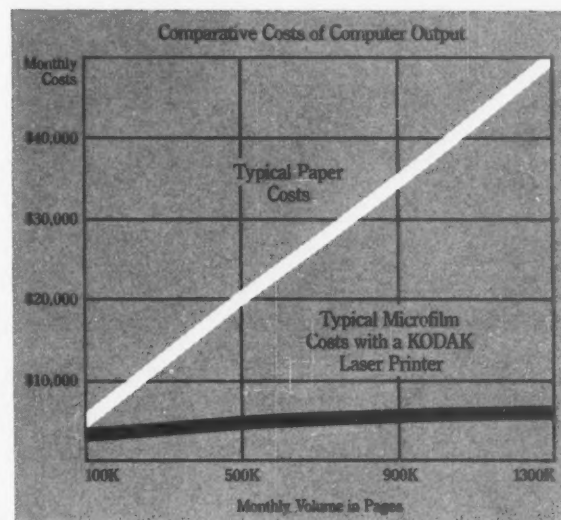
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# IDS Offers Gear for Communications Tests

LINCOLN, R.I. — A modem/channel simulator and a bit error rate tester with an EIA breakout panel have been added to the International Data Sciences, Inc. (IDS) line of data communications test equipment.

The Model 9150 simulator was designed to inject random errors into the transmitted or received data of any synchronous data communications system. It allows the operator to simulate noisy data channels and to test the error-recovery performance of the system.

Interfacing with all EIA-compatible synchronous modems and terminals, the Model 9150 simulates synchronous modems by providing clock timing to the terminals. Error rates are switch-selectable for each channel, as

is the density of noise, IDS said. The Model 9150 costs \$2,610.

## Tester, Breakout Panel

The Model 65/60 contains the bit error-rate tester and the breakout panel in a single system. The tester determines the bit error rate of synchronous and asynchronous communications systems, multiplexers and modems.

The tester contains both data transmitter and receiver, with the former generating six data patterns continuously under the control of the pattern switch. Repeating sequences are standard, the company noted.

Tests may be performed end-to-end or in a loop-back configuration. The Model 60 provides access to all 25 conductors of the RS-232C interface be-

tween the data terminals and the modem, with 12 LED indicators monitoring the status of the 12 primary signals.

Pins and jumper cables provide cross-patching, monitoring and signal-

testing capability, the company said.

The Model 65/60 costs \$850. Two rechargers — Model 22 for 115V- and Model 23 for 230V applications — cost \$20 each. IDS is at 7 Wellington Road, Lincoln, R.I. 02865.

## Remote Users Get Modem

SUNNYVALE, Calif. — Racal-Vadic, Inc. has begun production on a series of 1,200 bit/sec, half-duplex modems, designed for remote terminal users.

Known as the VA1250/55 series, the modems plug into standard telephone voice or data jacks. Models for leased-line applications also are available.

The modems are offered as a direct replacement for Bell 202C, 202E and

202S modems and feature an interface display with local loop back and Force Request to Send — used to isolate problems anywhere in the network.

The VA1250/55 series boasts CMOS components, automated manufacturing techniques and computer-controlled testing, as well as a power supply.

Unit prices start at \$425 with delivery in 60 days from Racal-Vadic at 222 Caspian Drive, Sunnyvale, Calif. 94086.

## Seminar Topic: Communications Plans in China

WASHINGTON, D.C. — A seminar examining the changing conditions in China and the potential market for telecommunications there will be held here on June 21.

The seminar was organized by Information Gatekeepers, Inc. (IGI) and will bring together industry and government leaders to meet at the Mayflower Hotel.

Major objectives of the conference are to study China's plans for a telecommunications network, to determine its present system and to recount the experiences of manufacturers and trade groups that have recently traveled to that country. The session also will discuss how one can go about business in China, IGI said.

Among the speakers are Hugh Donaghue, vice-president and assistant to the chief executive officer of Control Data Corp.; Stanley B. Lubman, a member of the law firm Heller, Ehrman, White & McAuliffe which specializes in Chinese affairs; and Erik Kihl, an international trade specialist with the Trade Development Assistance Division of the U.S. Commerce Department.

More information on the telecommunications conference is available from IGI at Suite 212, 167 Corey Road, Brookline, Mass. 02146.

## Terminal Compatible With DEC's VT-52

COLUMBIA, S.C. — Intertec Data Systems Corp. has upgraded its Intertube II video terminal to offer compatibility with the Digital Equipment Corp. VT-52 CRT terminal.

Standard features include a text editing system with character and line insert/delete, full and/or partial block transmit modes, protected and unprotected fields and a self-test mode for maintenance, Intertec said.

DEC VT-52 emulation for the Intertube II costs \$100. The Intertube with the DEC emulation is available for \$598 to \$895, depending on the chosen quantity, from Intertec Data Systems at 2300 Broad River Road, Columbia, S.C. 29210.

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# Data Base Processors: What Can They Do?

By Eugene Lowenthal

## IN DEPTH IN DEPTH

In 1972, Bell Laboratories attached a Digital Scientific Corp. minicomputer to a Univac mainframe in such a way that the mini performed data base management services for the bigger machine. Since that celebrated experiment, interest in data base processor (DBP) technology has accelerated, and several companies appear to be seriously interested in developing DBP products — frequently in cooperation with academic or government research efforts. As perhaps never before, hardware and software engineers are congregating in smoke-filled rooms, trying to understand each other's languages.

The activity in the DBP area is in response to the growing realization that data base management is a function particularly well suited to implementation in specialized hardware. In *Computers for the Millions* (March 1977), Dean Witter Vice President Duane Kirkpatrick stated that "the computer industry has gone through three generations of development to optimize machines for 10% of the workload."

Even the most advanced of today's computers are geared to efficient execution of sequential algorithms written in languages like Cobol or Fortran. Some employ parallel architectures to perform numerical computations on the order of several million operations each second.

But in increasing numbers, users are defining the job they have to get done in terms of manipulating files and data bases, not number-crunching. Nonnumeric processing now comprises such a large percentage of the workload that it is not unusual to find one or more mainframes devoted entirely to the data base/data communications workload in a DP facility.

A closer look at the resource utilization of nonnumeric processing reveals that the user-supplied application software plays a minor role relative to the demands that the data base management software (typically a packaged product) places on the computing re-

sources. The philosophy behind the DBP is to separate these "canned" functions from the user's code and move them to hardware that is better suited for the job than conventional hardware.

We have specialized front ends that offload the network management function from the general-purpose host so why not "back ends" to offload data base management? The front end is situated between the host and the communications lines, controlling those resources on behalf of application programs in the host. The back end would be deployed between the host and the data bases, controlling those resources for the same programs. The analogy is appropriate but it does not go far enough. The rationale for either device ultimately boils down to cost performance. But the opportunity for cost/performance improvement from specialized data base hardware far exceeds that from communications hardware, as I hope to illustrate in at least a qualitative fashion.

Cost/performance improvement is traditionally interpreted as an increased transaction rate for fewer bucks. What is not reflected in this interpretation is the increase in data base management systems (DBMS) capabilities that can be provided; for the DBP can be harnessed to provide DBMS capabilities that would otherwise be too expensive in a conventional environment with equivalent horsepower.

### User 'Wish List'

Consider the following "wish list" that describes capabilities any DBMS user can easily identify with:

- The DBMS ought to present a very high level interface to the user, perhaps even a natural, English-like language for the so-called, casual user.
- The DBMS should never permit invalid data to be entered or permit updates that would result in a logically inconsistent data base. The data base administrator should be able to express "integrity constraints" in a very general fashion with automatic enforce-

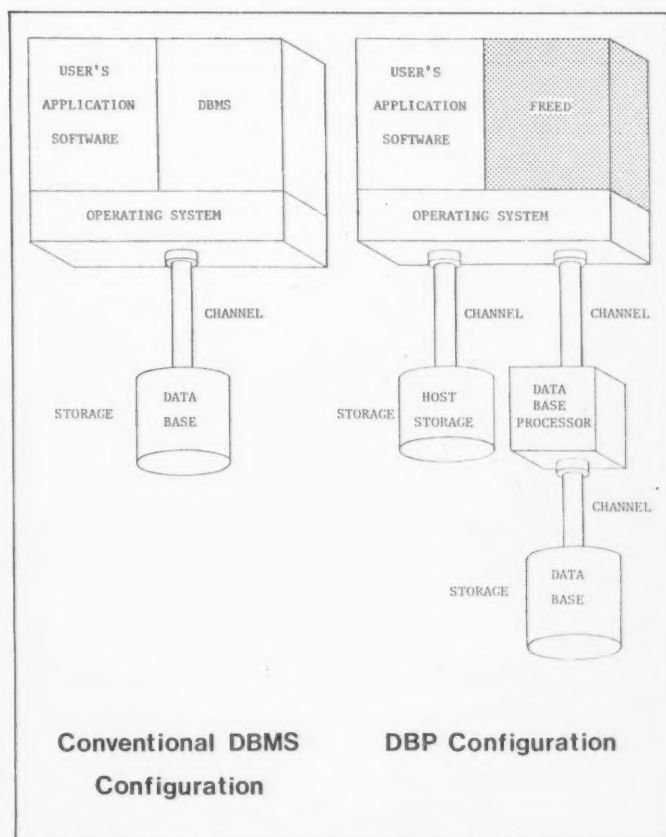


Figure 1

Charts by Diane Foster, MRI

ment by the DBMS.

- The security mechanism should be just as general, permitting the administrator to specify precisely what data a given user is authorized to manipulate (and in what manner).
- The data base must be available full time, come hell or high water, even if this means maintaining redundant copies of the data.
- There should be no constraints on the ability to relate data.
- A user should be able to access a 10-billion-character data base as easily and quickly as a 10-million-character

data base.

- It should be possible to physically restructure the data in any reasonable way without having to modify application programs or the user's logical view of data. Conversely, each user should be permitted to view data in the most appropriate way regardless of how the data base is actually stored or how other users view it.

• And, though Christmas be many months off, let's have a product that completely insulates the user from the fact that some of his data is in San Cle-

(Continued on In Depth/2)

## IN DEPTH

(Continued from In Depth/1)  
mente while the rest is at Key Biscayne.

A software DBMS may be built that satisfies these capabilities as much as software can, but the overhead would be so immense as to render the product practically worthless. An important goal of DBP technology is to implement such features at reasonable costs without introducing the wild variations in response times that an equivalent software system would exhibit.

But specialization has its potential downside aspects, as well. The spare capacity of a DBP cannot be used for other purposes when the data management workload is not sufficient to keep it busy. In other words, the maximum value of a DBP is realized in an environment that provides it a steady supply of transactions over a sustained

period, in contrast to a shop which experiences extreme variations (resulting in a DBP which is either overburdened or underutilized much of the time.)

Mitigating against this effect are proposed designs for keeping the DBP gainfully employed during quiet periods, say by reorganizing data, applying deferred updates, archiving files or performing other low priority data base tasks.

DBP technology is still too young to yield a uniform vocabulary. As a result, I have invented some of the terminology used here solely for purposes of communication. In other cases, I have fallen back on IBM terminology and examples as a point of reference. However, every DBP concept applies equally to other computers, large and small.

Further, much of the technical detail

supporting the concepts and conclusions has been omitted as has information on who is doing what in the DBP field. The objective is to present the technology and its potential. For a good bibliography of work in progress see the March 1979 issue of *Computer*.

### Processor Characteristics

A data base processor is an entity physically distinct from the central processor of a mainframe. Although DBMS capabilities can be "souped up" in a conventional computer by enhancing the operating system or microcode, the DBP approach requires physical separation of the DBP and the CPU. Thus, IBM's new System/38, which has some built-in DBMS capabilities, is outside the range of this discussion.

One or more DBP's are attached to a

host machine, which typically will be a general-purpose computer capable of executing user-developed application software. Figure 1 (on In Depth/1) illustrates the difference between a conventional computer configuration and a host-DBP configuration.

In principle, the host can be nearly any active device that has a need for stored data, such as a banking terminal or word processing station. In fact, certain kinds of DBP will have other DBP's as hosts (Figure 2).

So the term "host" actually defines a relationship between processors. A DBP is a special kind of peripheral to a host and a "slave" to it in the sense that it gets its marching orders from the host. However, a DBP may have some independent functions such as automatic data base recovery if the host crashes.

A given host may have several DBP's attached to it. Each DBP might control its own data base (or parts of data bases) separately from every other DBP, or else DBP's might control a common disk resource with uniform availability of all data.

I tend to view the latter case as a single "multiprocessing DBP" rather than several separate DBP's, but the distinction isn't important here. A given DBP might be attached to multiple hosts where each host is required to manipulate a common, shared data base. In fact, the DBP may be the only practical solution to shared access to an on-line data base by application programs executing in different manufacturers' mainframes.

### Host-DBP Connection

The nature of the connection between the host and the DBP needs further discussion. The level of the DBMS statements the host transmits to the DBP determines how much processing the DBP can accomplish before sending responses back to the host, which likewise determines how much information actually has to be transferred back and forth. If the sole responsibility of the DBP is to respond to DBMS statements expressed in a high-level query language, then generally the DBP can handle most of the processing and respond with only the desired results.

The amount of information transferred back and forth is minimal and a low-speed communications link, such as a 4,800 bit/sec telephone line, could very well be adequate. The two machines could even be in different cities.

But the majority of existing data base applications are now addressed by high-level, self-contained languages, nor are they likely to be in the next five years. Most data base accesses are accomplished by embedding somewhat lower level data manipulation language (DML) statements in an application program written in some language like Cobol or PL/I. In this situation, the host must handle more of the intermediate processing before a result is obtainable, forcing a significant amount of extra information to be

(Continued on In Depth/4)

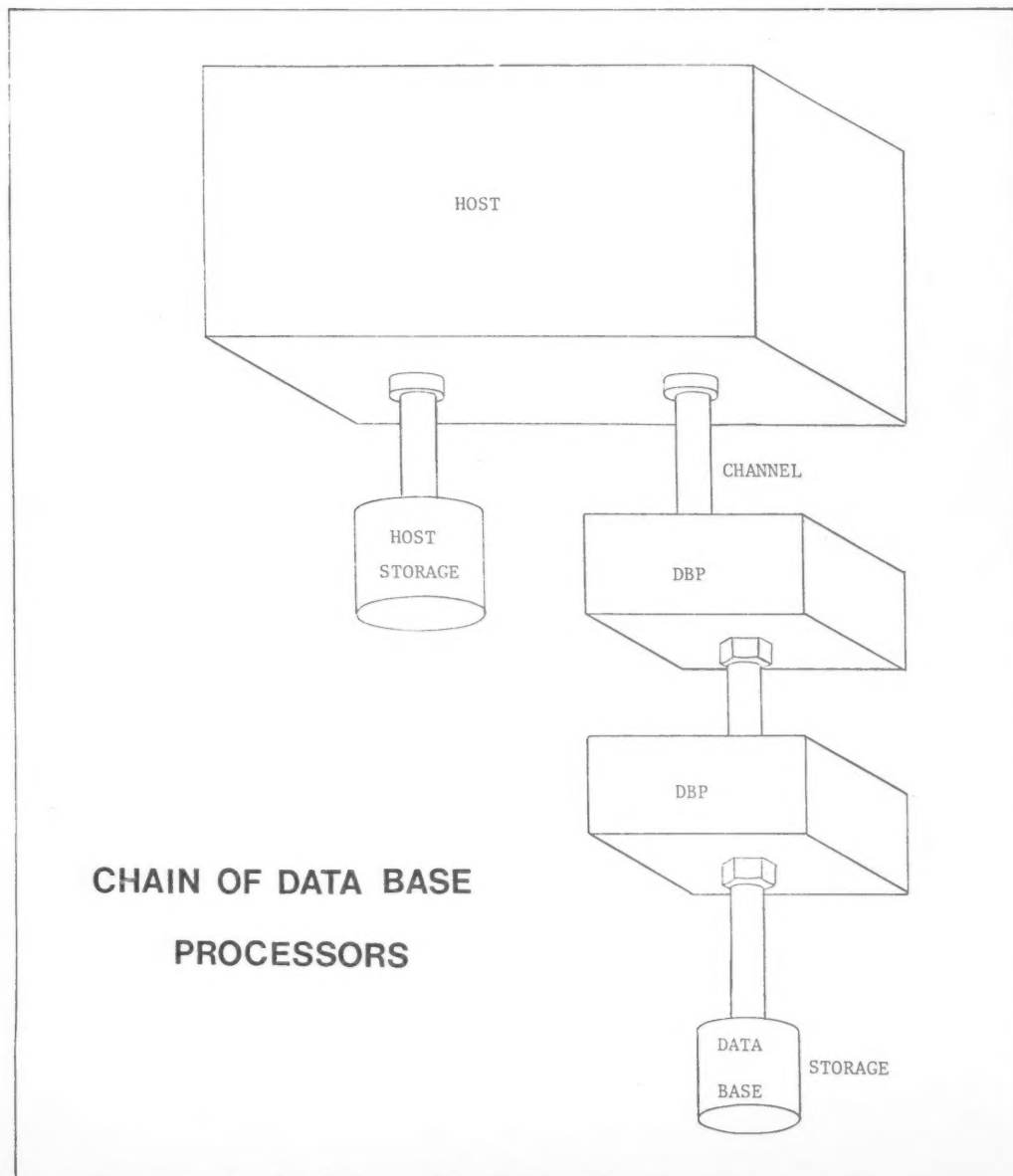
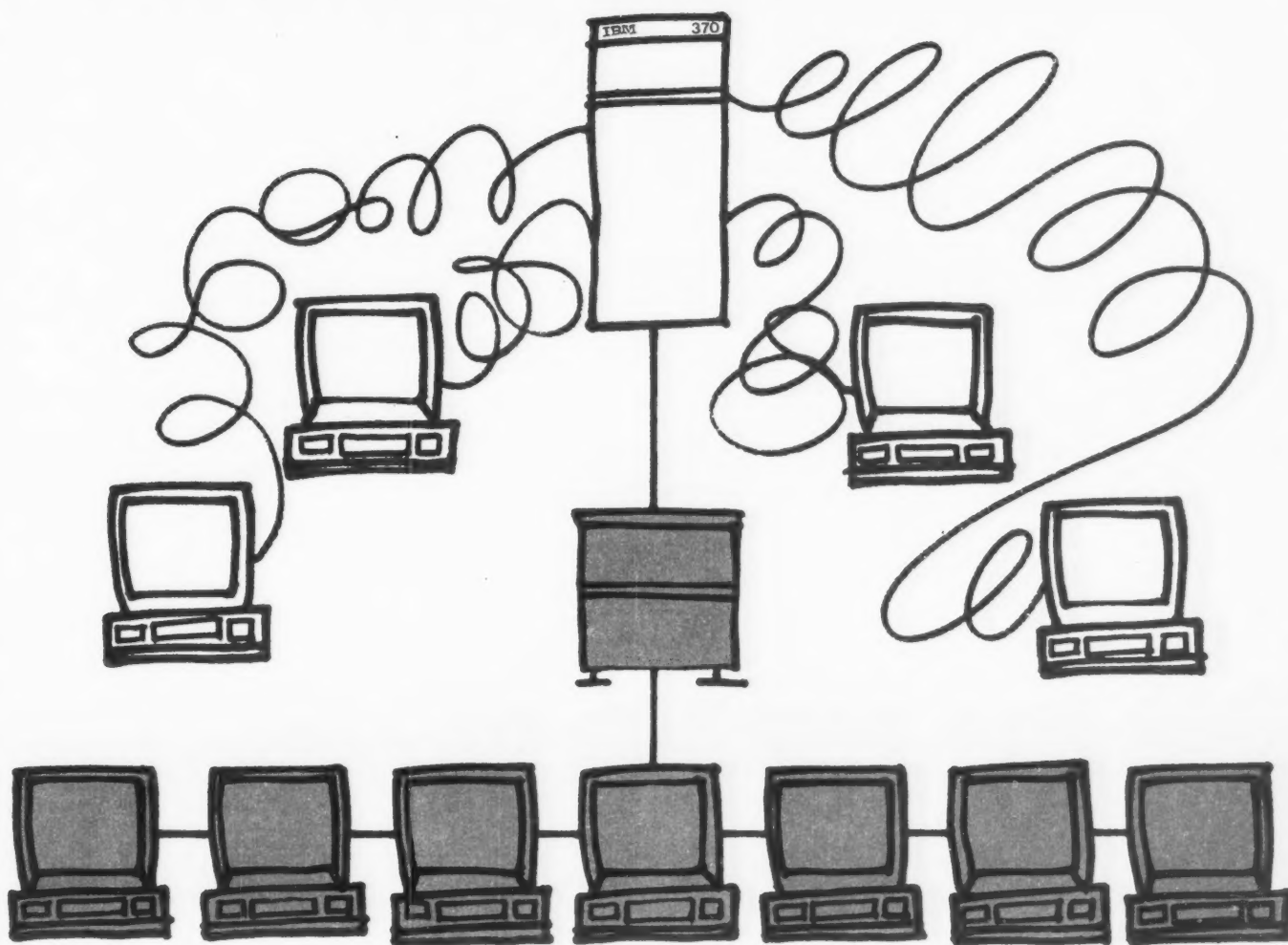


Figure 2



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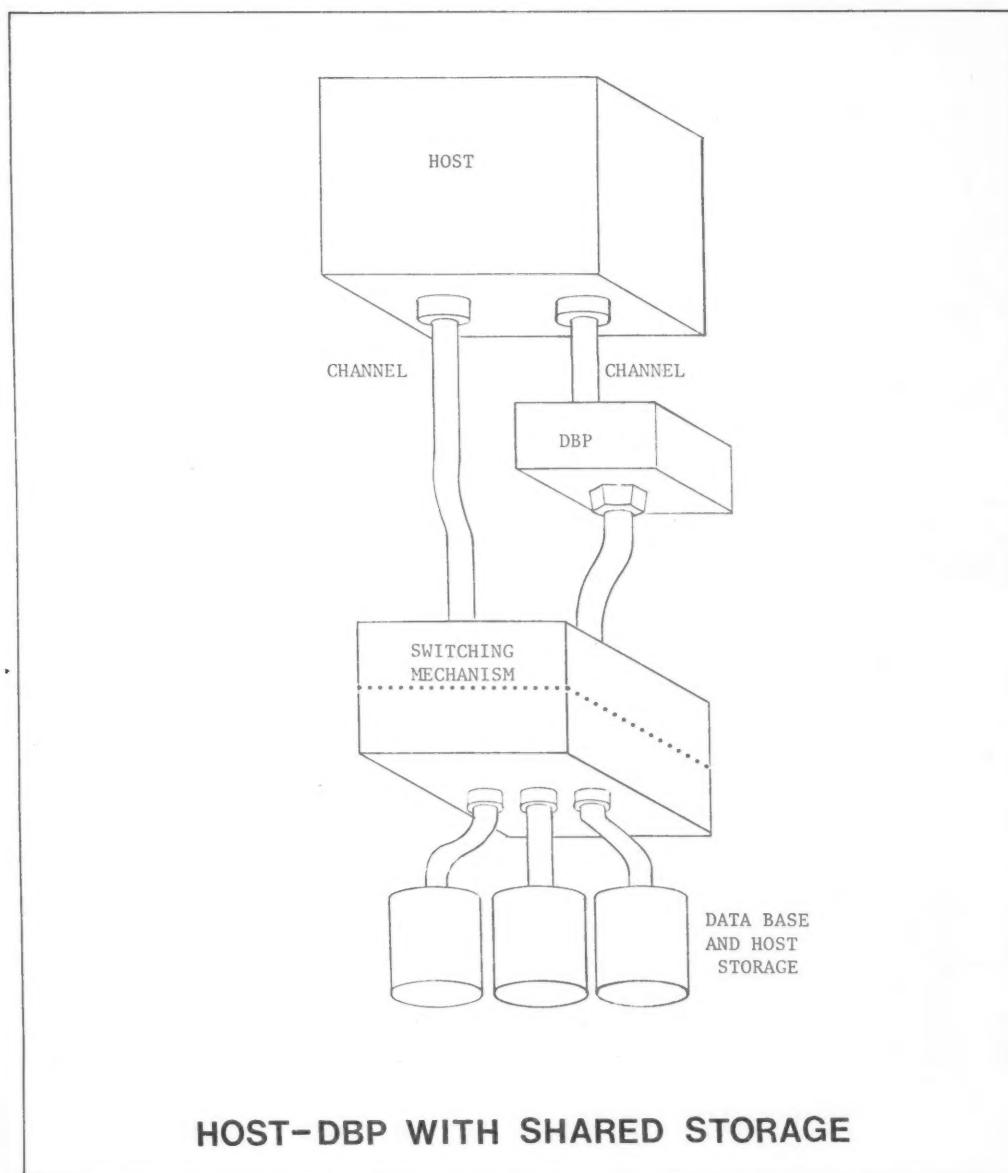


Figure 3

(Continued from In Depth/3)

As a practical matter, therefore, the DBP must be attached to the general-purpose mainframe through a high-speed channel or bus capable of transferring data in excess of 100 times faster than a telephone line. Consequently, the DBP must be physically close to the host, just like any other high-speed peripheral. This constraint will perhaps dissipate as communications technology advances or if high-level data base languages become the access method of choice.

One side of the DBP looks toward the host. The opposite side looks toward the data base storage, perhaps through another DBP as in Figure 2.

If the DBP supports the same devices as the host, it is technically possible for both machines to share the same set of resources (Figure 3). Otherwise the

user is required to install two sets of noninterchangeable devices, one for the files directly available to the host (system files, swap areas, program libraries and so forth) and one for the DBP's files (data bases).

The devices cannot be allocated to either machine on an as-needed basis. This is a minor problem as long as the amount of storage needed for data bases stays constant or grows smoothly over time. There are interesting arguments on both sides of the issue of whether a DBP should emulate devices familiar to the host, in which case the DBP fields all I/O and controls all secondary storage for the host.

Just as the DBP is physically emplaced between the storage media and the host processor, it is "logically" placed between the data base and the programs in the host that retrieve or store data. In other words, the role of

the DBP is to carry out all or part of what is regarded as data base management including, perhaps, data validation, index searching, data base interlocking, security checking, space management and so on. A DML statement executed in a host program ultimately gets translated into one or more DBP "calls," which are then translated by the DBP into actual I/O operations on a disk or similar device.

### Basic Definition

If it were important to provide a formal definition for DBP, it would probably be centered around the role of the DBP as embodying all or part of the DBMS. Such a definition would not by itself imply that the architecture of the DBP is specialized or optimized for this role. In fact, several experimental back ends have been built using conventional computers. But any com-

mercially viable DBP must offer some cost/performance advantage over a host-resident DBMS. And customizing the DBP certainly represents a means to that end.

Customizing is not necessarily confined to hardware. The DBP, like nearly all new processors, might be microprogrammable, with microcode optimized for data base management. A large, complex DBP might even have a software system in it under the control of a rudimentary "operating system," again optimized for the special role.

A paper-and-pencil experiment placed an IBM 370/158 between another 370/158, acting as the host, and the data bases. The host computer had all of the user's software while the other contained the complete DBMS with a simplified operating system and some special microcode assists. Even though the hardware itself was not customized, the net processor efficiency was estimated to be at least 25% better than that of a single general-purpose computer having twice the power of a 158.

One consequence of specialization is that the DBP might not be user-programmable, at least using conventional programming languages, particularly a general-purpose assembly language. Otherwise it would be necessary to reintroduce generality into the DBP architecture to support the user environment — a general-purpose instruction set, flexible operating system facilities, job control, debug tools, unit record equipment and so forth. This would defeat the purpose of the DBP.

On the other hand, there is a legitimate need for what are called "data base procedures," which are user-supplied routines invoked by the DBMS at certain stages of processing (such as a special data security check that cannot otherwise be described to the DBMS).

The ideal solution, in my view, is to give the user the way to develop and catalog such procedures in the DBP at a very high level. Such a limited form of programmability would not compromise the special nature of the DBP.

Returning to the definition of the DBP as a machine that executes all or part of the DBMS function, this says nothing about the DBMS itself. In principle, any DBMS can be "packaged" in a DBP. If a DBMS is regarded as a set of capabilities or language features, it may not matter to the user whether it is delivered on a software vendor's magnetic tape or in a crate or printed circuit boards.

However, the overall performance implications of stuffing a DBMS into hardware very clearly depends on the character of the DBMS. Not all marriages make equally good sense.

### DBP Classes

DBPs can be broken into three general classes: back ends, intelligent controllers and associative controllers. These classes are rather imprecise but are useful for purposes of discussion.

A back end is a DBP which has essentially the entire DBMS responsi-



bility. It may, of course, delegate portions of that responsibility to whatever subordinate DBPs are attached to it. Some nominal amount of software might still be required in the host, but for the most part the back end interacts with user programs at the DML level. That is, the back end is capable of directly interpreting data manipulation language commands. It may even be able to execute high-level queries.

But this is not to say that it is responsible for communications with user terminals. The role of a simple back end is to manage data bases, while transmittal of the user's queries to the back end is the domain of the host or perhaps a front end.

Figure 4 is an interesting variation on the back end theme. In this picture, the front end has been trained to detect data base queries and send them directly to the back end through a new link. Therefore, the host is completely factored out of query processing, which not only further unburdens the host but provides a degree of data base availability even when the host is down.

One way to regard this configuration is as a back end serving two hosts — a general-purpose processor and a communications processor.

#### Host Insulated

Because the back end interacts with the host at such a high level, it can totally insulate the host from the characteristics of the data base storage, and vice versa. The concept of complete device independence finally finds a home in the back end. Such device idiosyncrasies as character format, record format, track size, sector size or transfer rate are masked from the host software and hardware. There should be no impediment to indirectly attaching an IBM disk to a Honeywell mainframe through the auspices of a properly designed back end.

Deriving from the insulating property of the back end are three vital user benefits. First, advanced storage technology can be married to older mainframes or operating systems that cannot otherwise support new devices. You can't hang an IBM 3350 disk unit on your 360/40 because the operating system doesn't support the relatively new device, and even if it did, the Model 40 couldn't keep up with the disk's speed. If you want to use the new disk for data bases, the back end is not only a good solution, it is the only solution.

The second benefit of insulation is that it paves the way for the concurrent sharing of a common data base by multiple hosts (see Figure 5 on In Depth/8). The only effective way this can be done is by assigning control of the data base to one computer (the back end) and having the other computers communicate with the back end. The back end, as part of its data management responsibility, coordinates concurrent updating initiated by different terminals.

The adapters in Figure 5 translate data to the format expected by each

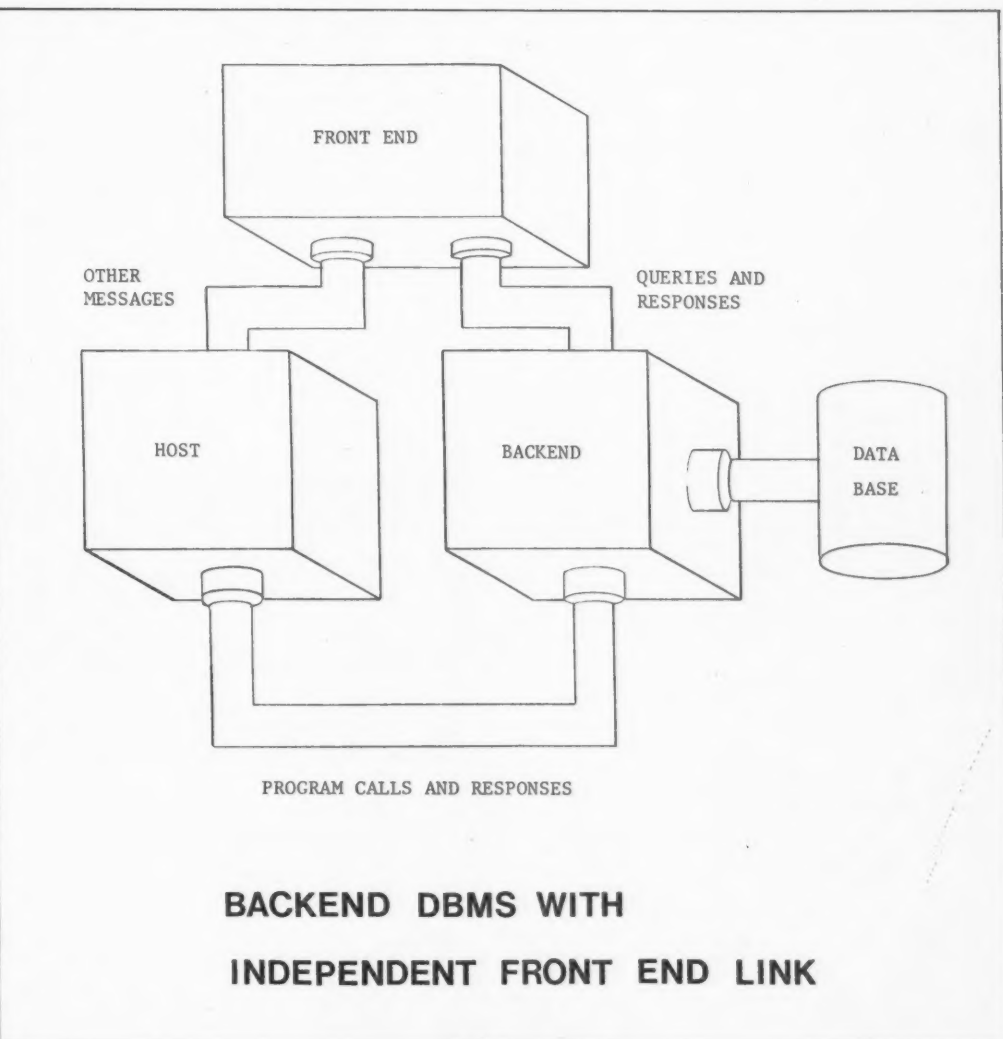


Figure 4

host type. For instance, if the Brand X host is a Control Data Corp. 6600, the X-type adapter will convert characters to and from the special 6-bit code characteristic of that machine.

In other words, a well-designed, very powerful back end has the potential to manage data bases for a collection of hosts, including many different kinds of CPUs arranged in a high-speed local network. In fact, the Datacomputer, developed by Computer Corp. of America, does exactly that, only in the context of the geographically dispersed Arpanet instead of a local network with a back end.

The third corollary of insulation is portability of the data base. The back end supports the interchange of data bases among different installations. Equivalently, the back end guarantees that the data base will survive should the need arise to replace the host computer with that of a different manufacturer.

This helps to reduce the DBMS user's dependence on a given mainframe vendor. Insulation, however, is not a guaranteed property of the back end

and will only be available in a flexible, well-designed DBP. A computer vendor, marketing both mainframes and storage products, would be likely to develop a back end with only very limited insulating characteristics, while an independent vendor would be more motivated to provide back ends adaptable to several mainframes and storage devices.

Another interesting property a back end product can exhibit is protection. A part of any DBMS responsibility is protection of data from accidental destruction and deliberate breaches of security. But as a processor separate from the host, the back end can extend protection mechanisms somewhat beyond the capabilities of a software DBMS.

A system captive in the host's memory drowns when hardware or operating system failure sinks the host. A back end can independently recover the data base when it detects failure in the host.

Even the hardest software DBMS can only stand helplessly by while some larcenous programmer dupes the

host's operating system into granting him direct access to the data bases. A back end cannot be bypassed in this particular manner.

Of course, complete protection is impossible, but a properly constructed back end can offer a very effective solution to an important part of the problem. If the back end is user-programmable, however, or if there is a direct path from the host to storage as in Figure 3, the back end's advantages over software will have been comprised significantly.

Be aware that this is another one of those topics burdened with technical nuances ("what if . . .") and vigorous differences of opinion. Also keep in mind that protection, like insulation, is not an inescapable quality of the back end. It would be no chore to design one every bit as vulnerable as the typical commercial operating system.

#### Intelligent Controllers

Intelligent controllers perform part of the data base management function but by no means do the whole job. (Continued on In Depth/6)

## IN DEPTH

(Continued from In Depth/5)

They are simpler than back ends and are less powerful. Yet they are still specialized for data base management.

A mechanical device like a card reader or tape drive needs special electronics to control it and to effect the transfer of data between the device and the bus or channel of the computer. If this circuitry is physically distinguishable from the rest of the computer, the resulting package is described as a controller.

The controllers we are interested in are those associated with the direct-access storage devices upon which on-line data bases reside. Today these are primarily disks. Sometimes parts of data bases are stored on the faster drums. Large, low-cost mass storage devices like the IBM 3850 or Ampex Corp. Terabit have been used to store very large data bases. In the future "electronic disks" may have a niche in the cost/performance spectrum.

For the discussion on intelligent controllers, it is sufficient to assume a disk technology context.

Most disk drives have several read/write heads, and many disk controller products can manage several attached disk units. Despite this multiplicity, the conventional controller is "single-threaded" in the sense that it can only handle one data transfer at a time. At any given moment, at most one head is active. Furthermore, regardless of whatever work-scheduling or error-handling power a conventional controller may possess, its bottom line responsibility is the simple movement of blocks of data.

The distinguishing feature of an intelligent controller is its ability to manipulate or test data in addition to moving it. A great deal of capability

can be added to a controller without requiring that several heads be concurrently active. To the extent that parallelism can be avoided, a particular intelligent controller need not be significantly more expensive than its simpler cousin.

The benefits of an intelligent controller are the result of a happy synergy between the additional intelligence and what a controller does naturally. The combination is characterized by the intimacy of processing with the flow of

data on the media. A controller is able to deal with data "on the fly" — that is, one character at a time as each character is sensed by a reading mechanism. A computer, in contrast, causes a block of data to be transferred from secondary storage to its main memory before the data can be processed.

Furthermore, a controller is constantly "aware" of the current position of the media relative to the read mechanism, while a computer generally must synchronize itself with a device

each time data is to be read or written. If a conventional disk controller is enhanced to perform within itself some operation on data that would otherwise have required the transfer of that data to the host, then overall response times will be reduced because of fewer wasted revolutions, less arm movement and/or less data moved to or from host memory.

An obvious candidate for enhancing the controller is the index searching algorithm used in many DBMS products

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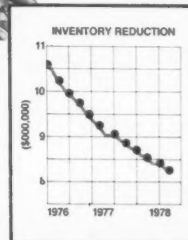
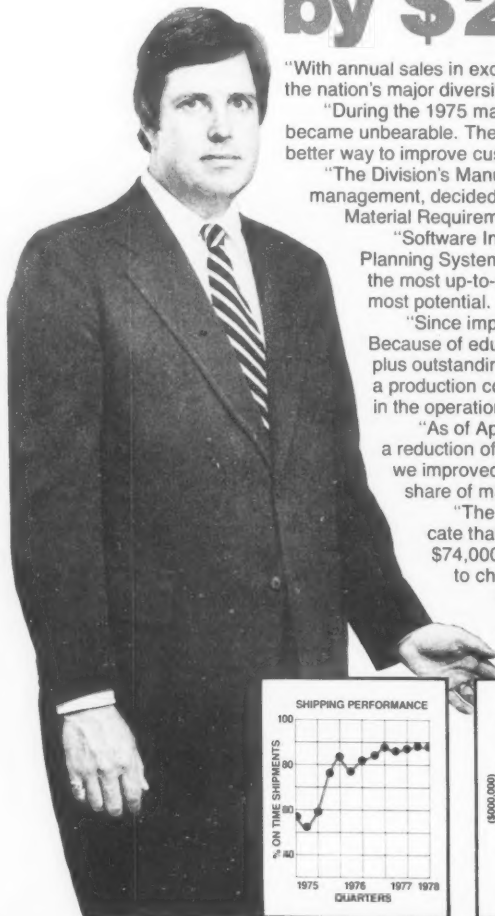
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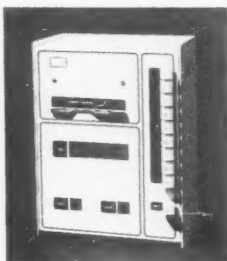
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## IN DEPTH

in one form or another. Currently, when the software algorithm is called upon to locate a particular value in an index, it reads a block of data from the disk unit on which the index is stored (the user might be able to set the block size but it typically is at least 4,000 characters).

The desired value may not be on the block, in which case the block contains the address of another block which is then fetched from disk. Based on a typical implementation, in the worse

case three blocks may be read from disk before the search is resolved. Three times the I/O subsystem has been invoked. Three interrupts have been processed.

Between read operations, another program may have caused the disk access arm to roam far from the index. Even if this hasn't happened, an average of approximately 8 msec is spent waiting for the disk to spin to the correct position for each read. Add to this at least 4 msec spent transferring each

block across the channel. Meanwhile, the host's memory has been bogged down accepting these blocks.

An intelligent controller customized to perform the entire three-block index search internally could reduce the search time by at least 50% as well as alleviate the host's I/O burden.

Sometimes the user wants to select records on the basis of some criteria for which an index provides no help. Suppose you want to produce a list of clients who live in a certain neighbor-

hood, based on the last two digits of the Zip Code. Since it is unlikely that an index has been maintained on this peculiar attribute, your program — or a DBMS working on its behalf — will end up reading every record in the client file, testing each for the desired Zip Code suffix.

An enhanced disk controller could be designed to conduct such screening internally, based on search criteria provided by the host. The only data that would be transferred to the host would be records that satisfy the stated condition.

## Possible Capabilities

There is no shortage of ideas concerning what capabilities one might endow upon an intelligent controller — the ability to reorganize files, for example, or to sort them faster and cheaper than any software method. There are proposals for controllers that encipher and decipher sensitive data, that maintain journals used for data base recovery or that execute Boolean arithmetic or relational operations on the appropriate data.

(Continued on In Depth/8)

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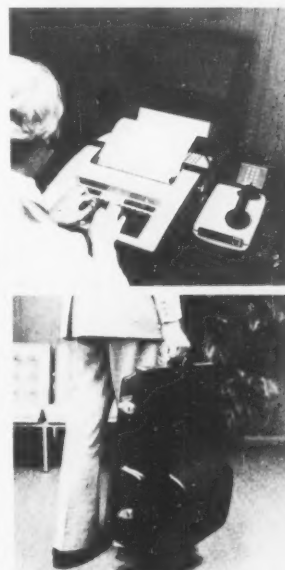
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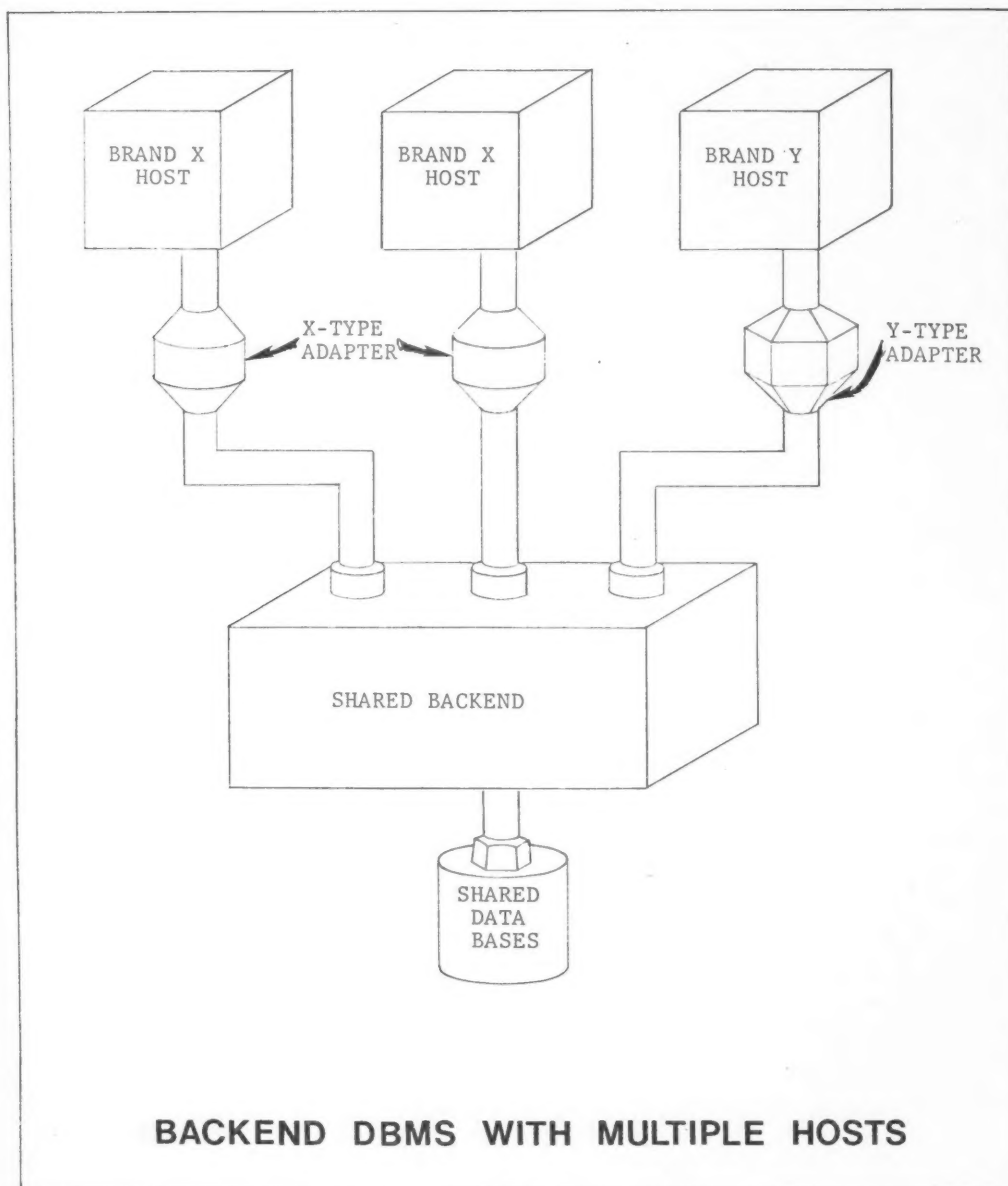


Figure 5

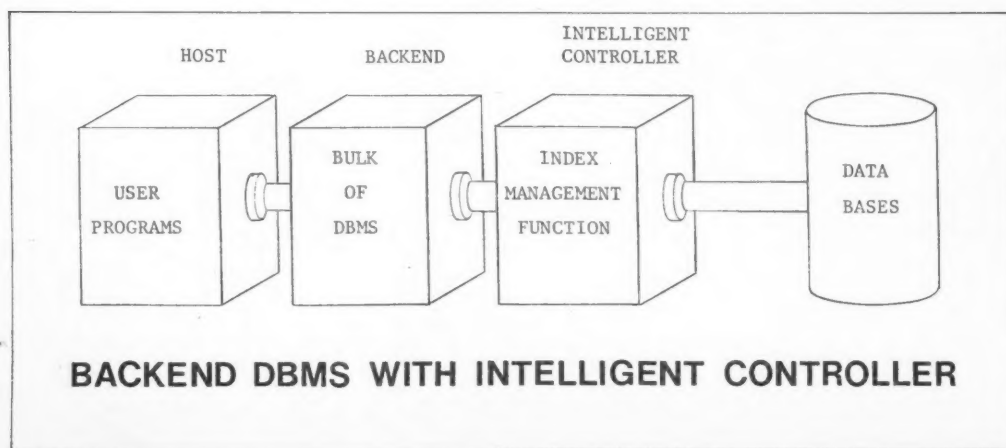


Figure 6

(Continued from In Depth/7)

All of these functions are now performed by software subsystems within a DBMS. Moving them outboard would improve system performance. The hard part is figuring out which opportunities make the most economic sense. This in turn depends upon knowledge of how people use data bases and what functions within a DBMS are most heavily exercised.

If a mainframe vendor develops an intelligent controller, it will most likely connect directly to that vendor's computer or perhaps be placed within the mainframe itself. There are several potential homes for this sort of intelligence emerging within the IBM architecture, for example the channel director in the 30 series, or the 3880 controller for the new 4300 series processors.

Independent developers are more likely to insert a back end between the mainframe and intelligent controller (Figure 6) in order to take advantage of the back end's insulating ability. This way the new device can be accommodated without having to modify and maintain the mainframe's operating system, an undertaking the independent avoids. The back end approach might ultimately liberate independent disk manufacturers from the confining strategy of strict plug-compatibility.

### Associative Controller

If the intelligent controller strives to add function while avoiding significant parallelism, the associative controller distinguishes itself by attacking both fronts head-on. Broadly defined, as associative controller is a direct-access device controller that is able to conduct several search operations simultaneously.

There are three types: controllers that execute the same search on different sets of data concurrently, those that execute different searches on a single set of data concurrently, and those that execute multiple searches on multiple sets of data.

Since the last type represents a combination of the capabilities of the first two, only the two fundamental types will be discussed. Do not confuse the associative controller with the general-purpose associative processor, such as Goodyear's Staran, where all the processing occurs in a small associative memory.

Consider the last example of the previous section — the problem of selecting clients with a certain Zip Code suffix. Even the intelligent controller, albeit superior to conventional searching mechanisms, can only look at one record at a time. Therefore, the search response time increases with the size of the file on a linear basis. A track on an IBM 3330 disk is about 13,000 characters long and circulates under the head 60 times a second. Assuming a client record is 130 characters long, an "intelligent 3330" could in theory test the Zip Codes for 100 clients in a mere 1/60th of a second.

But if you have a million clients, an  
(Continued on In Depth/10)



# Model 204 DBMS

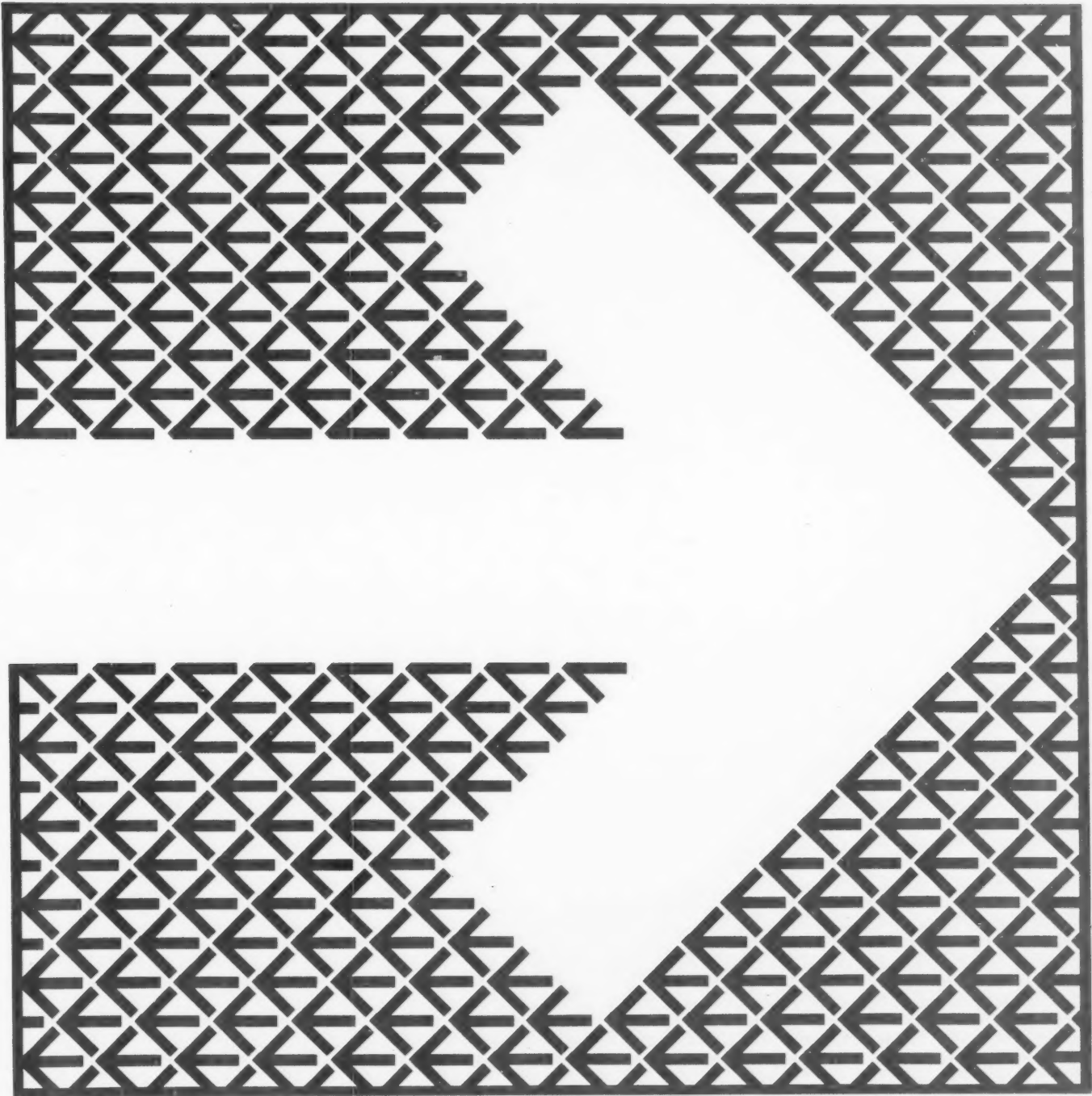
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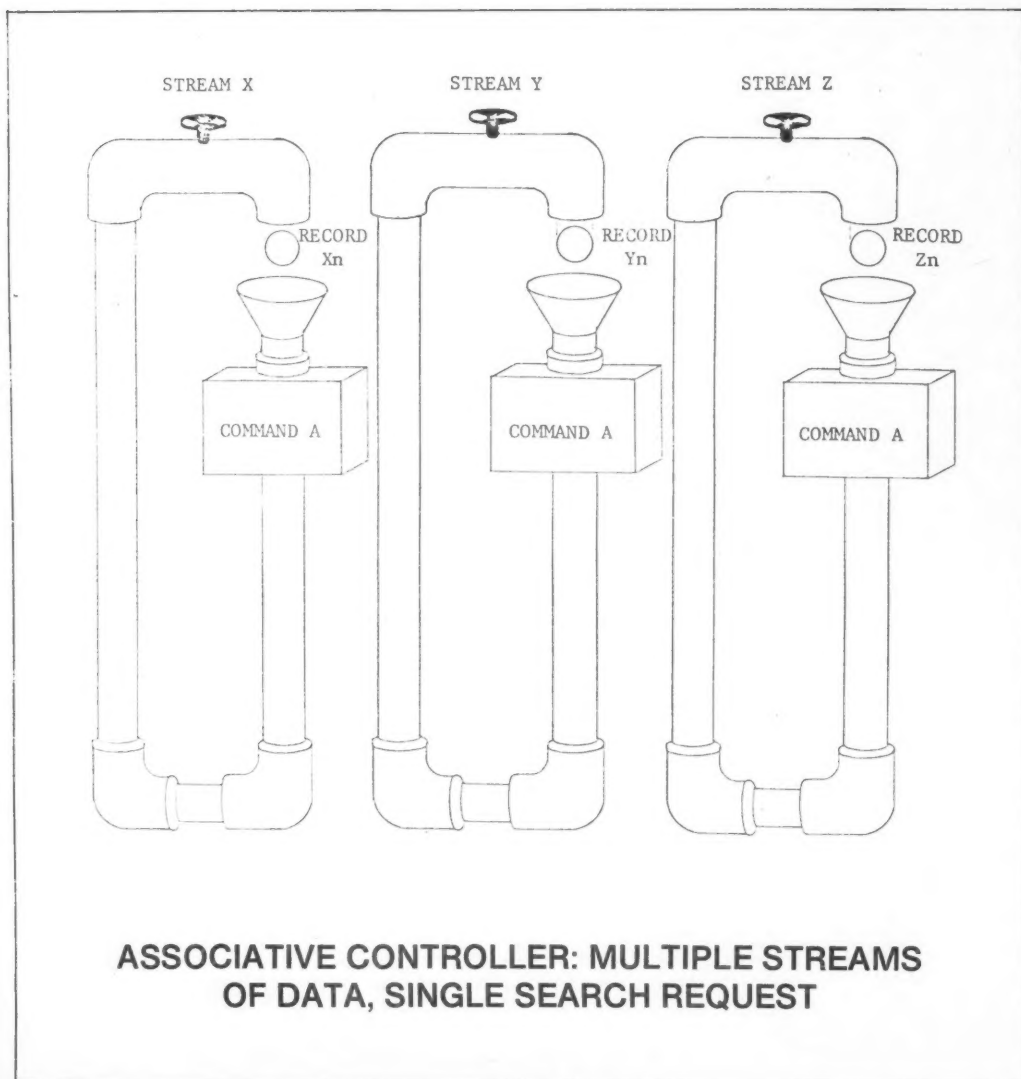


Figure 7

all clients, but in return yields a response in one-tenth of the time. Furthermore, a ceiling on response is guaranteed as long as additional search engines accompany additional storage to accommodate data base growth. Thus, response times can be constant rather than an increasing function of data base size.

If three minutes sounds like a long time, then consider a special 3330 disk which has a search engine for each track! Not cheap, to be sure, but the entire data base can be scanned in 1/60th of a second, regardless of the number of records.

Many such "logic-per-track" devices have been proposed. Most of them directly support complex queries involving combinations of conditions — for example, selecting all corporate clients in the Chicago area with current balances exceeding \$10,000. The capabilities of such advanced DBPs can be fully exploited only when they serve a DBMS whose DML permits the programmer to express search criteria at least as complex.

Existing Codasyl-oriented DMLs, for instance, do not offer a powerful search language, while relational DMLs do. This is one case where special hardware must be well matched to the nature of the DBMS it supports.

Electronic disks add a new twist to the logic-per-track concept, because the size of a "track" can be defined as needed. At one extreme, if a track is defined to be a single record, there will be one search engine for each record, yielding the fastest possible response at the highest possible cost. At the other extreme, a track is defined to be the entire data base — the degenerate case. Ideally, the user would be able to tune the configuration according to his particular performance requirements.

### For Single Data Stream

The second type of associative controller (Figure 8) presumes a single circulating stream of data — a long track, so to speak — against which several independent search requests are applied concurrently. By the time the data has made one circuit, all of the requests have been resolved.

In Figure 8, the processing for Command D is applied initially to Record 1 and then, in the next time slot, to Record 2. Once the processing of Command D on the last record in the stream is complete, commands A, B and C will also be complete.

You can compare this associative controller with a procession of guests going through a reception line. In one pass, everyone in the line has had the opportunity to shake each celebrity's hand, with no wasted motion. The elapsed time of one pass is practically independent of the number of celebrities in the reception line, assuming that there is a much larger number of guests.

Likewise, the response time of the second type of associative controller increases proportionally to data base size but remains constant regardless of the number of outstanding search re-

(Continued from In Depth/8)  
exhaustive search is going to take 10,000 times 1/60 seconds or nearly three minutes. If you have 10 million clients, the search time approaches one-half hour.

But, you observe, the data base with 10 million clients is so large that it must be distributed over several disk units, say 10. In that case (again in theory) the search can be conducted on all ten disk units concurrently, reducing the overall search time by 10-to-1, that is, to three minutes.

You have just discovered the first type of associative controller — an array of cooperating processing elements executing the same search, each on its own part of the data base. In Figure 7, three processors are handling three distinct streams of data from the data base, with each processor executing the same search command.

Continuing with the Zip Code example, there is one "search engine" for each million clients. This costs ten times more than one search engine for

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but he had another pair!

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quests. The third, most complex variety ensures constant response times independent of both data base size and number of requests.

If all you ever want to do is select and retrieve records based on the value of some prime key (such as invoice number or Social Security), you don't need an associative controller. You probably don't even need a DBMS. A conventional indexing or hashing approach would actually yield faster responses at far lower cost.

At the other extreme, it may frequently be necessary to:

- Select records based on the values of items other than the prime key (client location is Chicago).
- Select records based on complex combinations of conditions, using AND, OR, NOT (client location is Chicago AND current balance is greater than \$10,000).
- Select records using criteria for which a traditional indexing or hashing scheme provides no assistance (last two digits of Zip Code are 43) (current balance is greater than starting balance).

• Update keys, and therefore update whatever indexes have been created.

At some point between the extremes, the cost/performance superiority of traditional approaches is overtaken by the associative controller. Some argue that most programmers, analysts and even end users are so habituated to thinking in "indexed-sequential" terms that the potential value of an associative controller would not be perceived in the marketplace. This is a reasonable assertion, but ignores the possibility that demand for flexibility might be stimulated by the existence of technology that renders such flexibility more cost-effective to deliver. Maybe it's another rendition of the chicken-and-egg syndrome, after all.

The matter need not be viewed in black-and-white terms. A combination of conventional and associative techniques will probably emerge in commercial systems. Consider the old saw that 20% of the data is accessed 80% of the time. If it's true, the active 20% can be staged to a relatively expensive associative device while the remaining portion is managed by simpler mechanisms, all under the control of a supervisory back end.

#### Special Benefits of Back Ends

DBPs can provide significant advantages in the traditional DP shop. The back end class of DBP might eventually bring some special benefits to the world of distributed DP.

The concept of distributed processing has as a corollary the concept of distributed data bases. The only reason to connect computers in a network is to share resources, data being chief among these. As long as communications channels are slow or expensive, there will be a reason to move each segment of a data base to those locations where it is most frequently accessed. Therefore, the economic incentive to somehow manage distributed data bases will persist as well.

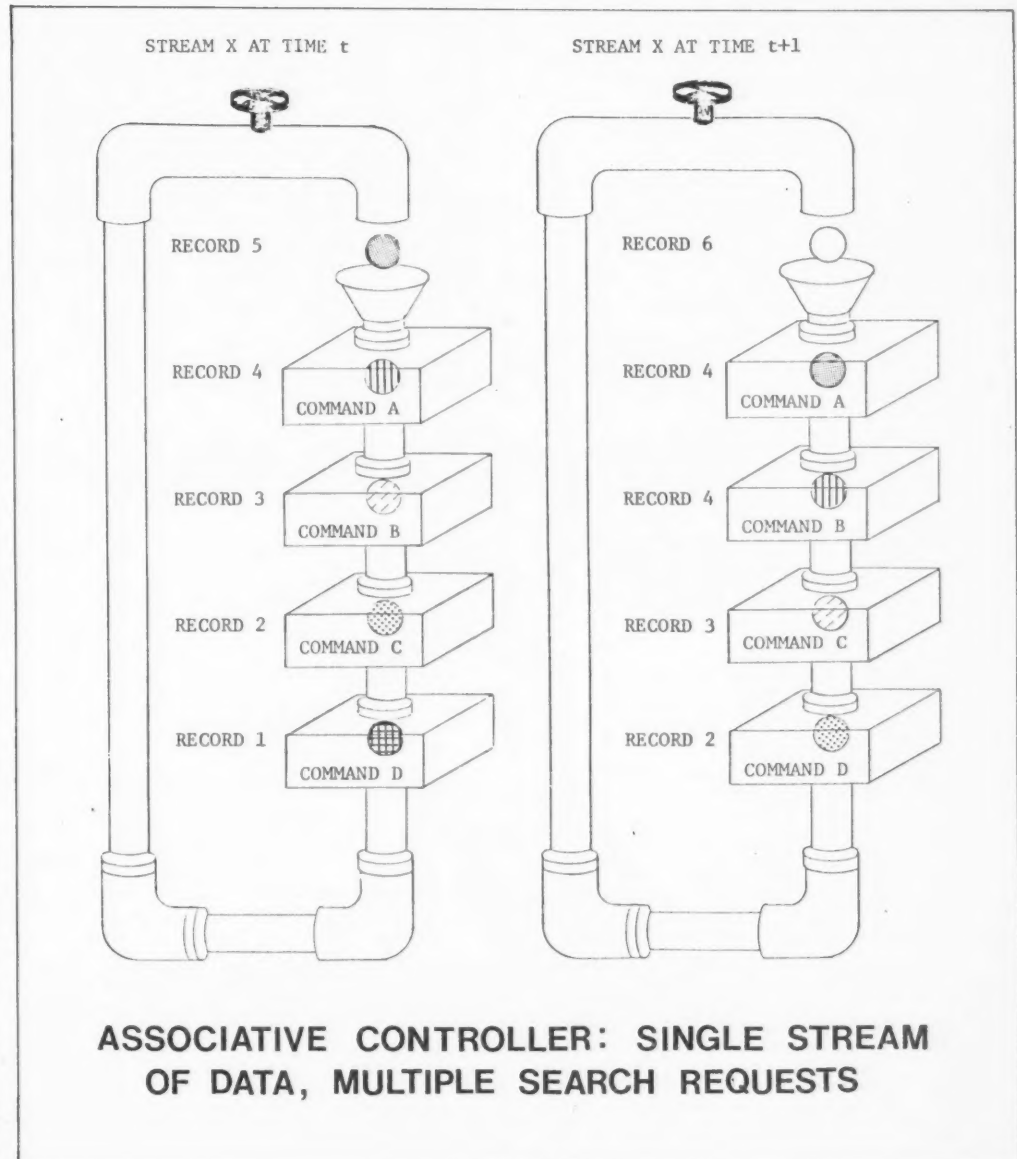


Figure 8

The technology for controlling distributed data bases is complex enough without the additional problems created by heterogeneous networks (consisting of different types of computers with noncompatible storage devices, data formats and so forth). Data cannot be moved from one mode to another without first being translated into some canonical form at one end and transformed again at the other.

"Translation" does not mean some simple encoding on a character-for-character basis. Somehow, the grouping of characters into items, the grouping of items into records and the interconnection of records must be grasped and transmitted.

Standardization of data manipulation languages and data definition languages would not be of much help here. Any two Codasyl-type systems, say IDMS and DMS-1100, differ

enormously in the way data is actually represented and organized on the media.

The translation issue goes away if every computer in the network is identical. In some environments, that would be less likely than everyone practicing the same religion. Even shops that are 100% IBM can have a translation problem.

But what happens if the owner of each computer in the network is told that he can express his individuality by his choice of computer, but he must put all sharable data on a compatible family of back ends attached to that computer? (Incidentally, using uniform back ends would not preclude the same back end providing different logical views of the data — for example, an IDMS view and a DMS-1100 view.)

Suppose further that each back end

has an independent connection to the network so that it can talk to other compatible back ends in the network without going through the host. Since the principal ground rule is that all of the back ends use compatible storage and uniform formats for representing structural data, it is guaranteed that data can be moved among the back ends without translation.

Because a back end, as I have defined it contains a complete DBMS, the cooperating back ends should be capable of assuming responsibility for the moment-by-moment management of the distributed data base. Such management requires that each back end maintain a global catalog of the data under the control of each back end in the network. The catalogs are used to decide intelligently which back end should handle each DBMS command,

(Continued on In Depth/12)

## IN DEPTH

(Continued from In Depth/11)  
where to route data and commands and how to consolidate results.

In the context of distributed processing, the most important attribute of the back end which allows it to take charge of the data base.

At this point, the back end will have graduated from a high-class peripheral to a considerably more independent network building block. There may be nodes in the network consisting of data base processors and communica-

tions processors, but lacking a general-purpose computer entirely.

Low-cost, microprocessor-driven back ends will probably be incorporated at the low end of the distributed processing scale. As in the large networks, the small back end will serve the role of providing a common data base access and storage vehicle for a variety of dissimilar hosts.

The hosts in this case might be small, general-purpose or business computers, but most frequently they will

be multifunction terminals or special terminals such as point-of-sale, banking or order entry units. Word and image processing centers are also included in this category, where the back end manages text or picture storage and retrieval for a variety of special equipment.

The sharing of data in such an environment would typically be accomplished in any of three ways:

- Direct connection of multiple hosts to a single back end, either in a local

network or even long distance if slower response times are acceptable.

- Transporting media (for example, disk cartridges) among compatible back ends, for instance carrying a collection of disk-resident documents from one office to another.

- Moving an order entry cartridge to the back end of a large computer for DP. This manual approach would be used when sharing is not frequent enough to warrant a telecommunications link.

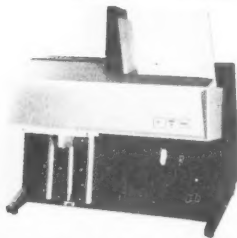
In each case, the use of a uniform, insulating, back end family would ensure portability of data.

DBP technology promises to provide unique solutions for some rather important data management problems, so much so that there is a danger of overlooking the DBP's role as a supporting character. More fundamental than the choice of DBP is the choice of DBMS the equipment was designed to serve.

For the user, the DBMS decision is more significant in terms of the overall effect on productivity and commitment to a product, because the decision implies a selection of facilities and languages. These are what programmers, inquirers, data base administrators and other users have to live with once a product is installed, regardless of how it is packaged.

Even DBP designers are forced to understand (and influence) how the DBMS will ultimately appear to the user in order to predict with any confidence the success of a particular design. Ignoring the full span between the user's application and the hardware gadgetry that finally executes it would only result in another iteration of the mistake Kirkpatrick so aptly described — optimizing the next generation of machines for the wrong workload.

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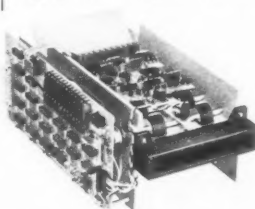


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Lowenthal is vice-president of advanced product design for MRI Systems Corp., where he focuses primarily on data base processor technology.

He joined MRI in 1970 to participate in designing the System 2000 and received his Ph.D. in computer sciences from the University of Texas a year later.

He was assisted in researching and writing this article by Chris Edmonson-Yurkanan, a market sales analyst.



**IN DEPTH  
IN DEPTH  
IN DEPTH  
IN DEPTH**



## **FACING UP TO CONVERSION**

**PART 1**

**BY BENJAMIN E. McMILLAN**

**T**he thought of a computer systems conversion often strikes fear in the heart of a DP manager. When he learns his current system will soon be insufficient to take care of current applications, there are many directions he can choose. If he gambles and makes a guess (even educated), he has a slim chance of succeeding. If he plans his approach, he can succeed on the first try.

This In Depth will attempt to offer some guidance to managers who desire some type of change, but are perhaps immobilized by fear from taking the first step.

When faced with a saturated system, the manager has the following choices:

- Do nothing and hope for the best.
- Reduce the workload.
- Turn to outside services.
- Incorporate facilities management.
- Use a new vendor or manufacturer.
- Refinance.
- Plan a new operating system.
- Duplicate the system.
- Upgrade current facilities.

The chances that a manager would do nothing are very slim because, first, it would get him nothing and, second, DP people cannot let systems go long without changes.

If the manager tried to reduce his workload, he would have to eliminate marginal programs. This process would create havoc among the users, and they would scream very loudly.

Outside services would be effective, but the manager would lose control and the internal DP people would be in insecure positions. This step would

prove to the organization that facilities management is excellent for small companies, but it would be suicide for the DP manager. This option is almost never taken by large companies because it would require sending the entire workload out to be processed and the DP manager would be left in limbo.

For a manager to change vendors, tremendous amounts of courage and daring are required, and conversion is usually a financial disaster. An operation that handles more than one vendor creates a difficult situation. Occasionally, companies will take this road, but only after they have become totally frustrated with the current vendor.

The refinancing method requires long-term plans and commitment to one mainframe or manufacturer for many years. This method also requires a great deal of planning to determine future needs.

Obtaining a new operating system is something that most installations do once a year anyway. It normally does not get the needed capacity for an increase in the workloads. This alternative is usually in the form of a suggestion from the manufacturer. Because the software is usually in poor shape, this type of change mostly creates work.

After all the above alternatives have been bypassed, the manager has two options left: to get a duplicate system or to selectively upgrade the current system. Both approaches have favorable and unfavorable attributes that must be assessed against the installation's needs.

There are two sides to DP: the technical and the administrative. Until recently, nearly everything written was on the technical side. This narrowness of scope is understandable, considering the fact that the dramatic feats of the technicians and their remarkable equipment provide more entertaining material than the uninteresting activities of those who administer DP.

*The DP manager with overburdened facilities faces some tough choices. He may be in for trouble if he fails to make an accurate assessment of his organization's future needs.*

*In this four-part series, McMillan offers some general guidelines for planning an efficient, cost-effective conversion and combatting the problems that often crop up along the way.*

In the absence of sound administration, however, the exciting promises of the technicians fail to materialize, and the so-called cost savings turn into an enormous and expensive farce.

While the failure to provide sound administration can produce dismal effects in other areas of the company,

neglect is perhaps DP's greater danger for several reasons. First of all, managements may be so impressed with the great power and versatility of computers that they may be led to think it possible to achieve savings despite weak planning, lack of sound organization and the resistance of their employees.

For another thing, many managements are not aware of the degree of coordination and integration that is needed to make DP pay off. A large-scale computer operation can touch on many areas of the company, and distress at the computer center can cause distress in other quarters.

Finally, the costs of failure and inefficiency can be substantial because of the investments involved.

In short, the very characteristics that make DP so attractive impose upon the company the need for rigorous planning and intelligent administration. Without good planning, sound administration, efficient systems and the active cooperation of the affected personnel, the power of the equipment is frustrated. But when such administrative support is provided, very attractive results can be secured.

This four-part article will describe and analyze the problems encountered by the computer systems function during conversion and give alternative solutions to the problems in the form of general guidelines. The question to be resolved is: "How may a large corporation select and install or convert a complex computer within a maximum time at a minimal cost?"

(Continued on In Depth/14)



## IN DEPTH

(Continued from In Depth/13)

Detailed guidelines in this series of articles will be relevant to (1) planning for the conversion, (2) computer system selection, (3) communications channels and (4) organization. These detailed guidelines are needed to facilitate a smooth transition to the new system. The detailed guideline method must satisfy a number of specific requirements:

- It must take into consideration all relevant activities that will take place.
- It must show clearly the relationship and interdependence of different activities and indicate which activities are more or less important.
- It must allow for realistic analysis.
- It must be suitable for monitoring progress and also be able to accept modifications and show the effect of modifications and other activities.
- It must enable the planning staff to establish the resource requirements on individual activities and apply a realistic time scale.
- It must provide a network of communications so that all involved will be well informed.

The responsibility for these guidelines and a realistic schedule falls on the DP manager and his planning staff.

It is a commonly held view that there are certain specific yet universal guidelines that always apply to a computer installation. It would indeed be very helpful if a clear and concise set of rules or guidelines could be constructed such that real or potential benefits could be associated with computer use. Unfortunately, past company studies have not yielded a net set of guidelines.

In a study conducted in the Minneapolis-St. Paul area, for example, 11 firms were investigated to determine if managements' computer objectives, acquisition practices, employment impact, system design, programming methods and many other factors associated with DP were viewed similarly. The researchers found a wide variety of objectives and benefits derived from computer use.

In stating the results of the study, the researchers, Andrew J. Grimes and Roger C. Vergin, said in *The Impact of the Computer: A Management View* that "no two firms experienced identical or closely similar results even though some of them are in the same business and established their computer installations at about the same time."

The study also found that despite lengthy preinstallation studies, no firm was completely successful in anticipating all the computer's major and minor benefits and disadvantages. This objective, in fact, may be nearly impossible. Because any given factor may be extremely important in one firm but not even exist in another, the experience of others does not provide a complete guide for the firm planning the installation or conversion of a system.

While it is generally accepted that planning is an essential element of conversion that contributes to the

overall success of the project, the need and the desirability should be established before extensive systems development is undertaken.

There is a point of diminishing returns in studying current DP systems as a prelude to considering the acquisition of new equipment, depending on the size of the company, the efficiency of the existing systems and the nature of proposed computer applications. There are two approaches to studying existing company DP systems — making

a superficial general appraisal or making detailed studies of all systems or of specific systems that may lend themselves to conversion.

Relatively few companies take the superficial approach. Those that do are usually small companies or companies with small systems. They generally give the following reasons for this course of action:

- The practicality of a new system is obvious because of the volume and kind of processing and recordkeeping

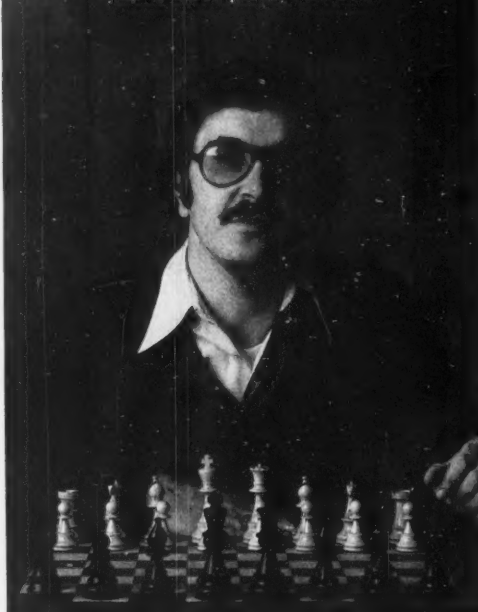
required by the company.

- Knowledge of the present system is fairly current and accurate because the company has a staff or group that constantly studies and reviews systems and procedures.

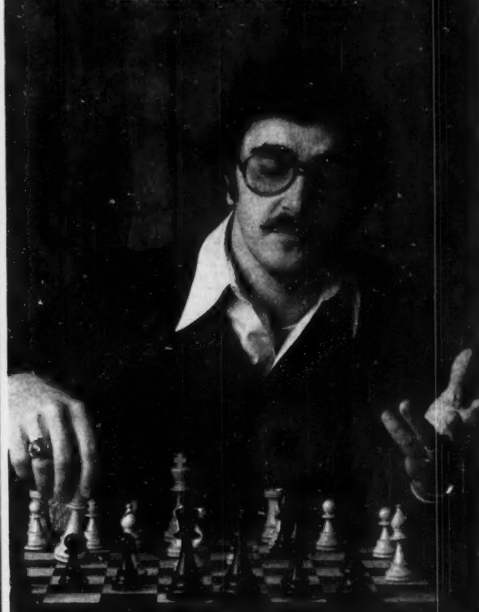
- A detailed study of the current system would take a long time and require more manpower than the company has available.

- Although a detailed and lengthy study of current systems might help avoid mistakes, it would delay the start

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"Bringing COM in-house was the only way to keep our data processing costs in check."



## IN DEPTH

of actual computer operations. With a business that is growing in size and complexity, a long delay would make it harder to transfer work from one system to another.

- Because the systems, procedures and information requirements of the company are constantly changing, detailed systems studies made in advance of computer installation might be out of date before they could be used.

- Because only a small- or medium-scale computer is contemplated and

the changeover would not greatly affect basic systems, a detailed systems study is unnecessary.

However, many companies encounter problems when they have approved a computer installation after only a casual appraisal of current systems and procedures. In a study conducted by the National Industrial Conference Board, it was found that companies that approved a computer after only a superficial study reported the following problems:

1. The selected equipment proved to be inadequate for the job because of insufficient capacity or because the hasty systems study had overlooked the need for easy access to information stored in the computer or on tape.

2. The equipment was larger and more expensive than necessary because the company had misjudged its DP needs.

3. The applications chosen were not the best but, once committed, the company had to continue with them be-

cause of the cost of converting back to previous systems.

4. Profitable uses of computer equipment were delayed by as much as a year or two because basic systems and procedures proved loose and unsuited to the needs of the new computer system. Rented or purchased equipment remained idle except for test runs while the company's systems and procedures were made compatible with the operation of the new equipment.

However, the study found that detailed studies offer some disadvantages, too:

1. Development of a sequence of operations and of coded machine instructions is a waste of time until one knows the make and model of equipment to be used.

2. Development of new systems for each of several different makes and models of equipment is too time-consuming; it can lead to confusion within the study group because of the sales pressures applied by the competing machine manufacturers in the course of prolonged comparative systems studies.

3. Information obtained from a detailed study of possible new systems is of little value to management in making a decision for or against using a computer. Senior management may not understand the technical details and would probably not have the time to muddle through them.

While the point of whether to plan detailed studies or nondetailed studies can be argued indefinitely, a certain amount of planning must be done, depending on the size of the system being considered.

Planning the overall conversion project will be discussed in detail later, but it should be emphasized at this point that planning is essential at all phases of the conversion process.

It is easy to see why some companies get bogged down right at the beginning. If this initial study is not approached properly, the whole conversion project will probably fail.

According to the National Industrial Conference Board's study, there are three basic approaches to the initial study:

- Analyze those tasks that are currently being processed on the old system.
- Study all DP systems of one segment of the company.
- Study all of the company's DP operations.

#### Study of Promising Applications

The most common approach is to study the DP tasks that appear most likely to justify the purchase or rental of a new computer system. Normally, these tasks include those that are currently being processed on the old system and certain new tasks that seem to have priority.

This approach usually speeds up the transition to new equipment. The consolidation and integration of company wide DP needs become long-range goals rather than immediate goals in

(Continued on In Depth/17)

## "TWO WORDS TURNED OUR MANAGEMENT'S ATTENTION TO IN-HOUSE COMPUTER OUTPUT MICROFILM."

*DP Officer, Mr. William Mengel of Guarantee Bank in Atlantic City, N.J., met with DatagraphiX recently and spoke about his role in convincing upper management to acquire an in-house COM system.*

**DATAGRAPHIX:** "Those two words management listened to must have been fairly strong."

**MENGEL:** "When you talk to management about new equipment that gets the job done efficiently, easily and quickly, two words immediately come to mind—*time* and *money*. A DatagraphiX Computer Output Microfilm system saves plenty of both."

**DATAGRAPHIX:** "How do time and money relate to an in-house DatagraphiX system?"

**MENGEL:** "When you use an outside service, your performance depends on their ability to ferry your microfiche and tapes back and forth, day after day. When your COM system is in-house, you've got a lot more control. You don't miss deadlines or waste money because of lost time."

**DATAGRAPHIX:** "Was the cost of the equipment a major factor?"

**MENGEL:** "Sure, but we hit the break-even point almost immediately. And with growth projected over the next five years, in-house Computer Output Microfilm will not only pay for itself, but save us a lot of money. After mapping out the past, present and future, it's definitely cost-effective."

**DATAGRAPHIX:** "What were the other advantages?"

**MENGEL:** "First, the system was very simple to incorporate into our DP operation. DatagraphiX offers a wide variety of hardware and software to suit our particular needs. We had a choice between off-line recorders, minicomputer controllers and on-line recorders which let us match our recorder to our specific COM requirements."

**DATAGRAPHIX:** "Was your decision to go with a DatagraphiX system also based on reliability?"

**MENGEL:** "We only heard good things about DatagraphiX equipment. It has a fine reputation for reliability. One-vendor service for preventative and on-call maintenance programs was also a major factor."

**DATAGRAPHIX:** "So you're pleased with your move to in-house COM with DatagraphiX?"

**MENGEL:** "For us, bringing COM in-house was the only way to keep our data processing costs in check."

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## IN DEPTH

(Continued from In Depth/15)  
such instances.

It is generally believed that a computer system's primary value is that it makes possible a consolidation and integration of DP and record maintenance. Restricted systems studies give little consideration to these possibilities.

The National Conference Board found that companies that make studies of one or a few applications encounter the following problems:

1. Staff members who know best how to accomplish the integration of DP have become occupied with problems of limited scope and are not free to help with the overall plan.

2. Staff members assigned to work on conversion lack guidance because the company has not yet worked out an overall plan for the consolidation and integration of computer systems.

3. The type of computer system the company had installed is not suited to integration of DP, and the cost of the changes that would be required discourages the company from going ahead with plans for the integration.

4. The psychological advantage of the conversion has worn off and key personnel lack the enthusiasm needed to effect consolidation and integration of companywide systems.

In addition, this method short-circuits the company's long-range objectives to consolidate all processing activities.

#### Study of One Segment

A second approach to the detailed study of current systems is to concentrate on all the processing needs of one segment of the company, such as accounting, inventory, scientific computations or even a main office or plant. It is less time-consuming than an overall study, and because each unit is sometimes self-contained, little coordination is necessary.

There are disadvantages to this method, however. The best-suited applications may be in a different segment of the company than the one studied. In addition, the study of only one segment may jeopardize the chances for an eventual company wide integration of computer systems because the new system may not meet the requirements of other company units.

Finally, the failure of a project in one area, because of an unsuitable application, may dissuade other units of the company from trying to use or get a new system.

#### Companywide Systems

This approach is best in the long run. A companywide systems study helps management to review all of its DP needs and stimulates thinking regarding all of the uses of DP by the company. It also improves the chances of selecting the proper equipment and enhances the establishment of an orderly, long-range plan for the DP function.

Many companies encounter problems with this approach. If the study is

poorly planned, it becomes impractical because too much manpower and money will be used. Also, if the timing is incorrect, the information developed will be out of date and useless. This topic will be discussed in more depth later.

#### Personnel Problems

The process of changing a large-scale computer has multifaceted effects upon personnel relationships and employee morale. Some relationships will

remain the same but new ones will also be established.

It is important that all personnel affected directly or indirectly by the conversion be involved to some degree. The involvement does not necessarily imply that an individual is a participant, but at least he is informed of the project's progress.

The transition will affect the following relationships:

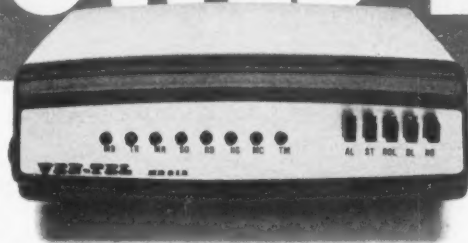
1. Intracomputer relationships — those involving operators, program-

mers and management.

2. Intercomputer relationships — internal relationships with computer users and computer-vendor relationships.

While the physical aspects of the computer facility receive the most attention during conversion, management must always be aware of the psychological factors that are just as important. Many times they are not apparent during the initial phases of conversion. (Continued on In Depth/18)

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## IN DEPTH

(Continued from In Depth/17)  
version, but the changes that take place sometimes threaten the security and well-being of many employees: Important projects have failed because employees refused to support them.

In *Managing the Introduction of Computer Systems*, Roger Tomlin wrote: "Careful planning is necessary to overcome the people problems that occur during the conversion process."

He further stated: "In the absence of careful planning, however, personnel

problems can become acute and disrupt both the implementation plan itself and the whole staff structure. The problem is very largely one of educating and informing all levels of staff and management exactly what the computer means to them personally, both now and in the future."

Resistance to change is a problem often encountered in making studies of new computer systems. Many involved personnel see the changes that take place as a disruption of normal

activities and methods that are currently in use. The reaction of many employees can be related to how well they understand the implications of the change and what difference it will make for them.

## Intracomputer Relationships

It is important to establish good lines of communication to personnel directly involved with a computer system. If they are poorly informed, destructive rumors begin to circulate.

Each staff member must participate in and agree with the setting of target dates so that when schedules are established, each will be motivated to do everything he possibly can to meet or improve upon those dates.

Staff members must clearly understand the importance of the projects they are working on. It is very difficult to motivate an employee unless he knows clearly that what he is doing is useful to the company paying his salary. If he does not understand the project, he will be poorly motivated either to complete it ahead of schedule or to look for better ways to complete it.

One of the best ways to motivate an employee is to make sure that he clearly understands the dependence of other people or groups on his performance. The computer operator, systems analyst or programmer who fully realizes the effects of his successes and failures on the organization, both within the computer systems function and within the user's organization, will more likely be motivated to superior performance.

Performance measurement is a key aspect of people management. People need to know whether they are doing a good job and in what areas they can improve. All assignments should be made clear so that management can tell when they are being performed properly. If they are not, management should move immediately to make adjustments.

Once a plan for the new systems development has been established, the proper working relationships must be established at the operational level between the systems analysts and programmers in the information systems area and people at the operational level in the functional area.

Continuing dialogue is needed in order to define in detail the specific methods to be employed in handling each aspect of the system. Some decisions in this area, such as the use of either flow diagrams or decision tables in the program documentation, are purely technical and need not involve the operations people. Other decisions are the responsibility of the operations area and need not involve the information systems people.

However, some decisions that must be made will ultimately affect both the systems programming people and the users. If these decisions are to be made properly, the working relationships must be established so that the systems people have a business orientation as well as a technical orientation toward the system they are designing. Equally important, the operations people must recognize the technical problems so that they will understand the cost ramifications of the different alternatives.

Unless those working relationships are established properly, the users may be forced to live with difficult or even untenable continuing operational conditions; or the systems people may have to tolerate a user decision which could adversely affect the performance or operational costs of the system. If

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(Continued on In Depth/22)

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## IN DEPTH

(Continued from In Depth/18)  
either of these conditions arises, the chances for a successful system will be significantly reduced.

### Intercomputer Relationships

In a large corporation, the DP function must be treated as a business; and, as any experienced manager knows, a major change requires cooperation at all organizational levels. It is management's responsibility to make sure that the customers (end users) are given

due consideration. The end user is a source of funds for computer payoff; and if he is dissatisfied, his lack of cooperation can render a computer facility useless.

The conversion process is, at least in part, similar to developing an information system, which, in turn, is similar to developing a product. Clear specifications for the product are established, a plan is developed for doing the work and resources are assigned. Then the plan is carried out under a system of

progress measurement and quality control that assures adequate and timely results.

This process is familiar to organizations involved in engineering and manufacturing (automotive, aerospace and oil companies). They seldom have difficulty organizing and controlling product development.

Converting a computer system is not the same as developing a new product, however. Because it is to serve people and will require them to behave in new

ways, it is subject to a variety of problems.

The group most affected by these problems is the users. Many times the user cannot define what he needs. To do so, he must see himself and his organization as they interact with the new system.

When the hardware arrives, he may find that the system does not work as expected. This disappointment leads to revised specifications either during or after the computer conversion, and the possibility of lost work.

Some users have become accustomed to the idea of generations of computer systems, experience with each making it possible to see what the specifications should be for the next.

End users and members of the DP organization usually have different backgrounds and motivation and don't always cooperate with one another.

To minimize this problem, end users should be involved at the beginning of planning for the conversion process, and DP management and the end user departments must be in complete accord about the nature and desirability of the computer conversion.

User management should approve the initial estimates of the benefits to be expected from the completed system. If they are not attained, the user rather than DP management is blamed.

### Working With the Vendor

Of all relationships outside the company into which the manager must enter, the most important is that with the vendor. If the manager establishes a good relationship with the vendor, he can save time and money. Of course, on the other hand, if he alienates the vendor, the vendor will not be very helpful in time of need.

The vendor or manufacturer has all of the available information on its current and future makes and models of computers. Because equipment selection is an important step in the conversion process, it is advantageous to have all the vendor's technical information readily available.

The computer manufacturer also stands ready to provide a number of services of a technical nature to help the customer make the transition to a new computer system, such as training, program preparation, programming aids, testing and debugging and site preparation and installation.

The vendor may assign a full-time representative to handle this assistance. In most cases, the representative knows the computer and how to program it so he can provide on-the-job programmer training.

If the relationship is good, large amounts of help may be forthcoming. However, it is risky to place too much reliance on the representative because company personnel may not be adequately prepared to take over the necessary functions and maintenance when the representative leaves. Of course, the competency of the representative varies and even the best may not know much about the user's business.  
(Continued on In Depth/24)

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## IN DEPTH

(Continued from In Depth/22)

It is the DP manager's responsibility to make sure that all relationships involving the computer function are on good terms. The system's success depends on these relationships. If they fail, the computer function fails.

### Organizational Problems

The problems that arise with obtaining a new computer system are primarily those of adapting to procedural and

organizational changes. In some instances, conversion does not affect the organizational structure to a great degree. But when the conversion represents a major change, the structure of the organization is changed.

Problems of organizational adaptation mean delays in the transition of computer systems. These problems are normally in those areas of the organization where personnel are not affected by the planning process. In the *Organization of the Data Processing*

*Function*, Frederic G. Withington said: "The organization's structure has a great deal to do with the success of the planning process: if the organization is badly structured, communications gaps and misunderstandings easily arise between designers and users."

Adaptation to technological change has been a managerial problem in American business for a long time. The adaptation process has been treated in terms of how those in authority in the organization should han-

dle the individuals who are being or are about to be affected by technological change. Various strategies have evolved, embracing retraining and dealing with problems of motivation and morale. But in all these strategies, it is executives who initiate the change, map out the direction the organization should take and then seek to get those affected to go along with a minimum of difficulty and conflict.

### A Bleak Picture

This picture is a bleak one because those in authority, those accustomed to planning an initiation change, now become the objects of change themselves. A vicious cycle is created. The problems of motivation and morale, of reluctance to change, of feelings of anxiety and threat, will be shouldered by those who are supposed to be doing an effective and rational job of problem-solving and strategy-planning. One very likely outcome of this situation is that the organization, as represented by its top-level people, may arrive at a less than optimal use of the technology.

The problems that are brought about by change, especially in a conversion process where the threat of a new computer system is paramount, will continue to plague managers unless proper procedures and guidelines are developed with the planning process.

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Benjamin E. McMillan is a specialist in computer systems acquisition for General Dynamics Corp. in St. Louis, where he has been employed for 12 years.

His work involves identifying opportunities for standardization and multi-site utilization and volume purchase and/or lease arrangements for equipment, materials and supplies for computer centers. He investigates new equipment and supplies as they reach the market and arranges to test, evaluate and make recommendations on their use by DP organizations within General Dynamics.

He also assists computer centers in preparing forecasts of future equipment and material needs.

McMillan holds a B.S. in mathematics from Central State College in Edmond, Okla. and an M.B.A. from Pepperdine University of Los Angeles.

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**Fact:** That's the way most computer manufacturers operate. They offer a family of models, each substantially more expensive as the user upgrades.

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**Good-news fact:** The Lockheed System III has an RPG II compiler that makes it highly compatible with IBM and other brands. It's easy to replace the limited-performance system the user now has with an expandable Lockheed System III.

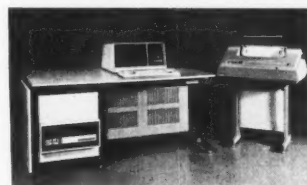
**Quick facts:** System III brings you field-proven reliability. Provides multi-tasking in a multiple terminal situation. It's easy to use; a secretary can learn to run it in a short time.

## Facts for the skeptical reader:

If System III is such a great idea, why aren't all the other computer firms offering low-cost systems with low-cost expandability? Answer: The System III comes from the company that built the world's fastest plane, the world's highest-flying plane, the world's biggest plane; the company that has built more spacecraft than anyone else; the company that built the recorders that help bring photos from Jupiter and Mars. And a lot more. Maybe that's why no one else offers a system like the Lockheed System III.

## More common sense:

Shouldn't you scrap planned obsolescence in computer systems? Call W.W. McCaffery toll-free at (800) 526-7555 or drop him a line. Or attach your business card to this ad and mail it in. Lockheed Electronics, 1501 U.S. Highway 22, C.S. #1, Plainfield, New Jersey 07061.



## Lockheed System III

# TGIF Algorithms

By R. A. Cornish

**T**he pace of most large operations winds down on certain days such as Saturday or Sunday, and some process control programs need calendar routines for stopping or modifying control functions on those days.

The following algorithms, for example, were originally developed for a power management system used to limit peak demand. A requirement of this system was to shut down air-conditioning and heating units over the weekend. Because of economic factors, a limitation in core size precluded the use of a high-level language requiring a compiler or interpreter, or large software routines such as floating point arithmetic.

Because of these limitations, the only requirements for these algorithms are a standard instruction set, arithmetic/logic capability and multiply/divide routines, either hardware or software.

All the algorithms in this article will be outlined step by step, followed by a table to illustrate the algorithm. The following labels will be used to denote either registers or memory locations. All ranges in parentheses are in base 10.

MO — Month (01-12); input to computer, stored in binary.

DY — Day (01-31); input to computer, stored in binary.

YR — Year (00-99); input to computer, stored in binary.

DM — Maximum days in a month (01-31); calculated.

DAYS — Elapsed days in a year (000-366); calculated.

DW — Day of the week (0-6); calculated.

FD — First day of the year (0-6); calculated.

The intent of these algorithms may be simply stated as follows: When an operator enters the MO/DY/YR as 10/02/78, the computer stores the entry as 78; 275 (YR; DAYS) and responds with Monday, October 2, 1978. In this example, the labels defined previously would be:

MO — 10                      DM — 31  
DY — 02                      DAYS — 275  
YR — 78                      DW — 1  
                                    FD — 0

The first algorithm is used to ensure that an operator entry does not exceed the maximum days in a month such as 02/30/78.

Since all of the algorithms calculate leap years, it should be pointed out that in the Gregorian calendar, the beginning of a century is not necessarily a leap year even though the year is evenly divisible by four. If the first two digits are divisible by four with no remainder, it is a leap year. Thus 1900

and 2100 are not leap years, whereas 2000 is.

This may be important if you are using an extended cash flow analysis on your project. In these algorithms, however, the current century (1900) is always added to the YR entry to determine (Continued on In Depth/29)

**IN DEPTH  
IN DEPTH  
IN DEPTH**

*When the primary purpose of the computer is process control, the software is invariably written in assembly language. In some processes, it may be necessary for the computer to ascertain when the weekend occurs (and tell the operator). The four algorithms in this article have been developed by the author toward this end.*

	MO	1A	1B	1C	1D	1E
JAN	0001	1	31			28, 29
FEB	0010	0				
MAR	0011	1	31			
APR	0100	0			30	
MAY	0101	1	31			
JUN	0110	0			30	
JUL	0111	1	31			
AUG	1000	1	31			
SEP	1001	0		30		
OCT	1010	1	31			
NOV	1011	0		30		
DEC	1100	1	31			

Table 1

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If you would like more information on the *Model 820 KSR* impact terminal, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

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(Continued from In Depth/27)

mine leap years.

**Algorithm 1:** Given the MO and YR, find the maximum days in the month (DM).

This algorithm is based on the relationship between the most significant bit (MSB) and the least significant bit (LSB) of the number of the month expressed in binary.

1A. Exclusive OR the MSB with the LSB of MO.

1B. If the result is 1, the number of days (DM) is 31. Exit.

1C. If the result is 0, and the MSB is 1, the number of days (DM) is 30. Exit.

1D. If the result is 0, the MSB is 0, and the second MSB is 1, the number of days (DM) is 30. Exit.

1E. If the result is 0, and the MSB is 0, and the second MSB is 0, the number of days (DM) is 29, if  $(1900 + YR)$  is divisible by 4 with no remainder, 28 if not.

Table 1 (on In Depth/27) illustrates the steps.

**Algorithm 2:** Given the MO, DY and YR, find the elapsed days (DAYS).

This algorithm depends on finding the number of days up to the month given to which DY can be added.

2A. Subtract 1 from MO, multiply the result by 30 and store the product P.

2B. Subtract 1 from MO, divide the result by 2 and store the quotient Q and the remainder R.

2C. Add  $Q + R + P$  and store the result in B.

2D. If Q is greater than 3, and R is equal to 0, add 1 to B and store the result in B.

2E. If Q is equal to 0, the elapsed days (DAYS) is equal to  $B + DY$ . Exit.

2F. If Q is not equal to 0, and  $(1900 + YR)$  is divisible by 4 with no remainder, the elapsed days (DAYS) is equal to  $B - 1 + DY$ . Exit.

2G. If Q is not equal to 0, and  $(1900 + YR)$  is not evenly divisible by 4, the elapsed days (DAYS) is equal to  $B - 2 + DY$ . Exit.

These steps are shown in Table 2.

**Algorithm 3:** Given the YR and DAYS, find the MO and DY.

This algorithm takes advantage of the symmetry in the number of days in the month of the periods March through July and August through December.

3A. Divide  $(1900 + YR)$  by 4. If the remainder is 0, subtract 61 from DAYS. If the remainder is not 0, subtract 60 from DAYS.

3B. If the result of the subtraction is negative, set MO equal to 0, subtract 1 from DAYS and store the result in DAYS.

3C. If the result of the subtraction in 3A is not negative, store the result in DAYS and subtract 153 from DAYS.

3D. If the result of the subtraction is

Elapsed Days (DAYS) From MO, DY and YR								
	2A P	2B Q	R	2C B	2D B	2E DAYS	2F DAYS	2G DAYS
JAN	0	0	0	0		0+DY		
FEB	30	0	1	31		31+DY		
MAR	60	1	0	61			60+DY	59+DY
APR	90	1	1	92			91+DY	90+DY
MAY	120	2	0	122			121+DY	120+DY
JUN	150	2	1	153			152+DY	151+DY
JUL	180	3	0	183			182+DY	181+DY
AUG	210	3	1	214			213+DY	212+DY
SEP	240	4	0	244	245		244+DY	243+DY
OCT	270	4	1	275			274+DY	273+DY
NOV	300	5	0	305	306		305+DY	304+DY
DEC	330	5	1	336			335+DY	334+DY

Table 2

negative, set MO equal to 2.

3E. If the result of the subtraction in 3C is not negative, store the result in DAYS and set MO equal

to 7.

3F. Divide DAYS by 61 and store the quotient  $Q_1$  and remainder  $R_1$ .

3G. Divide the remainder  $R_1$  by 31

and store the quotient  $Q_2$  and remainder  $R_2$ .

3H. DY is equal to  $R_2 + 1$ .

(Continued on In Depth/30)

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## IN DEPTH

(Continued from In Depth/29)

3I. MO is equal to  $MO + 2Q_1 + Q_2 + 1$ .

This algorithm for a nonleap year is illustrated in tables 3A and 3B.

**Algorithm 4:** Given the YR and DAYS, find the day of the week (DW).

This algorithm is based on the fact that the same day of the week occurs on the same date every 28 years. In order to determine the day of the week (DW), the first day of the year must be determined. Although the Gregorian calendar was not instituted until 1582, this algorithm would compute January 1, 0001 as Sunday.

Create a file of literal strings with address DYFL as follows:

DYFL + 0 - Sunday

+ 1 - Monday

+ 2 - Tuesday

+ 3 - Wednesday

+ 4 - Thursday

+ 5 - Friday

+ 6 - Saturday

This algorithm computes the relative file address (DW = 0-6). A similar file for months can be created with (MO-1) being the relative file address.

4A. Divide  $(1900 + YR)$  by 28 and store the remainder  $R_1$ . If  $R_1$  is equal to 0, set  $R_1$  equal to 28.

4B. Subtract 1 from  $R_1$  and divide the result by 2. Store the quotient  $Q_2$  and the remainder  $R_2$ .

4C. Multiply the quotient  $Q_2$  by 5 and divide the product by 7. Store the remainder  $R_3$ .

4D. Add  $R_2 + R_3$  and subtract 7. If the result is not negative, store the result in FD (First Day). If the result is negative, store  $R_2 +$

(Continued on In Depth/32)

MO and DY From Elapsed Days (DAYS)

	DAYS	3A -60	3B DAYS	3C DAYS	3D -153	3E DAYS	MO
JAN	1- 31	-	0-30				0
FEB	32- 59	-	31-58				0
MAR	60- 90	+		0- 30	-		2
APR	91-120	+		31- 60	-		2
MAY	121-151	+		61- 91	-		2
JUN	152-181	+		92-121	-		2
JUL	182-212	+		122-152	-		2
AUG	213-243	+		153-183	+	0- 30	7
SEP	244-273	+		184-213	+	31- 60	7
OCT	274-304	+		214-244	+	61- 91	7
NOV	305-334	+		245-274	+	92-121	7
DEC	335-365	+		275-305	+	122-152	7

Table 3A

MO and DY From Elapsed Days (DAYS)

	3A-3E DAYS	MO	3F $Q_1$	$R_1$	3G $Q_2$	$R_2$	3H DY	3J MO
JAN	0- 30	0	0	0-30	0	0-30	1-31	1
FEB	31- 58	0	0	31-58	1	0-27	1-28	2
MAR	0- 30	2	0	0-30	0	0-30	1-31	3
APR	31- 60	2	0	31-60	1	0-29	1-30	4
MAY	61- 91	2	1	0-30	0	0-30	1-31	5
JUN	92-121	2	1	31-60	1	0-29	1-30	6
JUL	122-152	2	2	0-30	0	0-30	1-31	7
AUG	0- 30	7	0	0-30	0	0-30	1-31	8
SEP	31- 60	7	0	31-60	1	0-29	1-30	9
OCT	61- 91	7	1	0-30	0	0-30	1-31	10
NOV	92-121	7	1	31-60	1	0-29	1-30	11
DEC	122-152	7	2	0-30	0	0-30	1-31	12

Table 3B

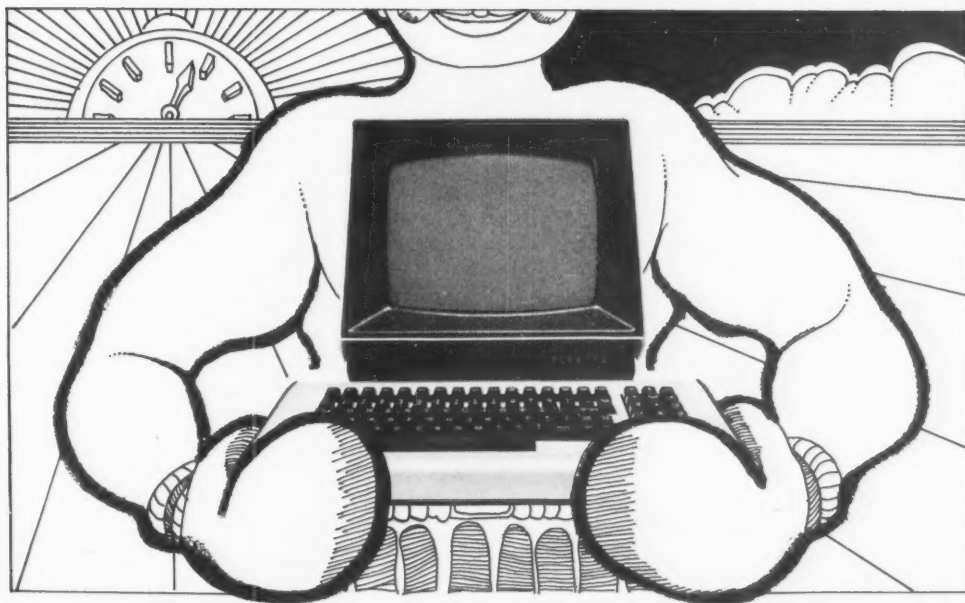
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## IN DEPTH

(Continued from In Depth/30)

 $R_3$  in FD.

4E. Divide the elapsed days (DAYS) by 7 and store the remainder  $R_4$ . If  $R_4$  is equal to 0, set  $R_4$  equal to 7.

4F. Subtract 1 from  $R_4$  and store the result in  $R_4$ .

4G. Add FD +  $R_4$  and subtract 7. If the result is not negative, store the result in DW. If the result is negative, store FD +  $R_4$  in DW.

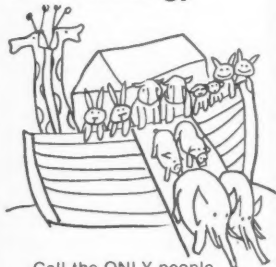
Table 4 illustrates this algorithm for the years 1961 through 1988. Table 4A shows the conversion from FD to DW.



R.A. Cornish is a senior engineer at Western Electric's Mountain-Northwestern Regional Headquarters. He is presently engaged in the design of hardware and software for process control and test set computer systems.

He has a B.S.E.E. from Manhattan College, N.Y. (1959) and an M.S.E.E. from the Polytechnic Institute of N.Y. (1968).

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FD (First Day of Year)						
YEAR	4A $R_1$	4B $Q_2$ $R_2$		4C $R_3$	4D FD	
1961	1	0	0	0	0	SUN
1962	2	0	1	0	1	MON
1963	3	0	2	0	2	TUE
1964	4	0	3	0	3	WED
1965	5	1	0	5	5	FRI
1966	6	1	1	5	6	SAT
1967	7	1	2	5	0 (7)	SUN
1968	8	1	3	5	1 (8)	MON
1969	9	2	0	3	3	WED
1970	10	2	1	3	4	THU
1971	11	2	2	3	5	FRI
1972	12	2	3	3	6	SAT
1973	13	3	0	1	1	MON
1974	14	3	1	1	2	TUE
1975	15	3	2	1	3	WED
1976	16	3	3	1	4	THU
1977	17	4	0	6	6	SAT
1978	18	4	1	6	0 (7)	SUN
1979	19	4	2	6	1 (8)	MON
1980	20	4	3	6	2 (9)	TUE
1981	21	5	0	4	4	THU
1982	22	5	1	4	5	FRI
1983	23	5	2	4	6	SAT
1984	24	5	3	4	0 (7)	SUN
1985	25	6	0	2	2	TUE
1986	26	6	1	2	3	WED
1987	27	6	2	2	4	THU
1988	28 (0)	6	3	2	5	FRI

Table 4

Sum of FD + $R_4$								
4E	$R_4$	1	2	3	4	5	6	7 (0)
4G	$R_4$	0	1	2	3	4	5	6
FD								
0	SUN	0	1	2	3	4	5	6
1	MON	1	2	3	4	5	6	0
2	TUE	2	3	4	5	6	0	1
3	WED	3	4	5	6	0	1	2
4	THU	4	5	6	0	1	2	3
5	FRI	5	6	0	1	2	3	4
6	SAT	6	0	1	2	3	4	5

Table 4A

## On Photographic Plates

# Patent Granted for Data Reading Method

By Howard A. Karten  
CW Staff

PALO ALTO, Calif. — A patent for reading and writing data on silver halide photographic plates using lasers was recently granted to Drexler Technology Corp. here. The patent could signal a whole new era of data storage in which one billion bytes could be stored on a disk 12 in. in diameter by 1/16th in. thick.

Although no working devices based on the patent have yet been constructed, a prototype could be built within six months, and practical, working versions could be available within two years, according to Jerome Drex-

ler, company president.

The method described in the patent depends on a laser beam that projects a pinpoint of light at translucent photographic material. The light causes a clear spot to appear on the material, and the presence or absence of these light spots corresponds to the familiar 1s and 0s of binary data representation.

The photographic material is actually positioned between the laser beam and a photodetector. Since the optical qualities of the material are known in advance, the detector can feed back to the control circuitry whether the expected intensity of light came

through the material. If the actual amount of light detected differs from the expected amount — caused, for example, by a scratch in the emulsion — a signal indicating "ignore previous data" can be written on the material.

This method assures accurate data recording, Drexler maintains, and should be cheaper and faster than alternative methods that have been proposed by other researchers in the field.

Neither the concept nor the densities achieved with the technique are particularly new, Drexler was careful to point out. Rather, the important feature of the method is that it allows for

instant detection of errors that occur in writing data and inexpensive, optical reproduction. In the past, laser recording techniques required that the film be developed before the search for errors could begin.

### Boon for Small, Large Users

Drexler Technology, whose main business supplying products to the semiconductor industry for chip manufacturing, has been working on the idea for two years, Drexler indicated. The company is now offering customers a license to use the technique in conjunction with supplying prototypes, he said.

A working version of a drive would be a boon to both mini-computer and mainframe users, Drexler believes. For example, one mainframe vendor sends out approximately 7,500 tapes, containing software updates, every six months, Drexler observed. Duplicating the data optically would be less expensive than current methods, and distribution costs would also be significantly lowered, he asserted.

Nor would the use of the drive be limited to mainframe users. "The home computer market

(Continued on Page 86)

## Amdahl Opens Center in Maryland For East Coast Customer Service

By a CW Staff Writer  
COLUMBIA, Md. — Amdahl Corp. has taken steps to expand services for its East Coast customers with the opening of a systems support center here.

The eastern systems support center will house classrooms for user education, a parts depot and the company's around-the-clock remote trouble-shooting system, the Amdahl Diagnostic Assistance Center (Amdac).

A spokesman for the Sunnyvale, Calif., firm, which currently divides the eastern and southeastern regions of the U.S. into six support regions, said the center will augment the services of the hardware and software specialists available within each region.

In addition, the eastern support center will benefit both customers and the company, he claimed. "We have grown to the point where it's not practical to try to run the whole world out of Sunnyvale, so we are decentralizing some functions out to the field. We are putting those func-

tions closer to the customer, which will result in the ability to sustain and digest our growth rate.

"Those groups start to become very large, if you make them large enough to support the installed base we have," he explained.

Amdahl uses the term "critical

mass" in talking about the size of a department or group, and it is the company's belief that roughly 35 people should be the group's upper limit. Therefore, the company decided to install a second group closer to users.

There were several reasons for picking Columbia, Md., for that

(Continued on Page 86)

### Vendor 'Just Down the Road'

## Neodata: First to Use CCD Disk

By Tim Scannell

CW Staff

BOULDER, Colo. — Like a local mechanic taking a neighbor's new car out for a test spin, a magazine subscription fulfillment company here has elected to be the first user of nearby Storage Technology Corp.'s (STC) Model 4305 semiconductor disk unit.

STC is "just down the road, so there's a good communications channel and the relationship is good," according to Roger Loeb,

DP director for Neodata Services, Inc. "If you wanted a place to test a device using new technology — a place where you can get your engineers close to it quickly — then we make an ideal site."

Introduced more than eight months ago, STC's solid-state disk unit incorporates charge-coupled devices (CCD) rather than the traditional oxide-based materials used in disks and other magnetic recording media [CW, Sept. 25]. The disk is hardware-

and software-compatible with IBM mainframes and is marketed as a direct replacement for IBM's 2305 fixed-head drive.

### Produces Mailing Labels

Neodata is a subsidiary of the A.C. Nielsen Co., known for its television-rating service, and maintains mailing files on more than 33 million subscribers to 106 major magazines. Although the firm doesn't handle the publications itself, it is responsible

(Continued on Page 88)

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# Amdahl Extends East Coast Customer Service

(Continued from Page 85)

group's location. It is within one hour's travel time of most East Coast and Southeast customers; it is close to an airport; and it should mean that the company will be competing for hard-

ware and software specialists in a different geographic market, which should make this competition easier, the spokesman noted.

Two other factors influenced the choice, he said: it saves customers the

time and money it would cost to fly to Sunnyvale, and the Columbia area offers a more hospitable environment.

"There are fewer days of the year we'll be closed down here by the weather as opposed to, say, Boston," he commented, referring in part to the 1978 snowstorms that paralyzed that city.

The company is presently in an 8,000 square-foot installation, pending completion of a 60,000 sq-ft facility next year. Of that 8,000 sq ft, the spokesman estimated that less than 20% is devoted to parts storage.

## No Negative Effect Expected

Opening the center will not have any negative effect on the company's West Coast operations. "We are not making

the Sunnyvale groups any smaller to staff this center; the growth is occurring by building the organization, instead of the existing one in Sunnyvale.

"You can very quickly dry up the market in one metropolitan area if you've got a company that goes from 3,000 to 5,000 people in 1.5 years; you've sucked up a whole lot of the available labor market in one geographic area," the spokesman pointed out.

The Columbia facility, the first major Amdahl facility in the U.S. not located on the West Coast, reportedly will be joined by others next year. The spokesman declined to estimate the cost to Amdahl of setting up this facility except to say it was "significant."

# Patent Granted for Method Of Reading, Writing Data

(Continued from Page 85)

lacks inexpensive, mass storage facilities," he stated, adding that a disk capable of holding one billion bits of data would provide for more widespread use of data bases on home computers.

control mechanisms, recorded by the laser, that serve to guide and control it, Drexler explained.

Nor is dirt contamination a big factor, he said, since error detection and correction codes, as well as other features, can overcome this vulnerability.

## Well Within Reach

N.V. Phillips is selling a video disk player for \$600, and RCA is planning to sell a disk player for \$400, according to Drexler, so an optical device for DP would be within the reach of small-scale computer users of all types. In addition, the device would have a high data transfer rate — probably in the neighborhood of 10M bit/sec, he said.

Approximately 25 firms worldwide, most of them well-known, are working on variations of laser recording of data, Drexler noted. Many of these are concentrating on using lasers to "burn holes" in exotic metal media, but Drexler's technique is applicable to either silver halide emulsions, used in preparing photographic masks for semiconductor chips, or photoconductive coatings, he said.

Optical handling of data in the fashion envisaged by Drexler has several advantages over other forms of storage, he claimed. First, data is stored in a form roughly 1,000 times more dense than conventional disk packs. In addition, the cost of the emulsion for a 12-in. platter would be approximately \$50, he estimated, or roughly 5 cents per megabyte.

This compares with \$3 per megabyte, (or \$600, for a 200M-byte disk pack) or 7 cents per megabyte for microfiche storage.

In addition, optical storage and laser reading of the media has an advantage over conventional microtext formats in that it can be directly interfaced to a computer.

## Minor Obstacles

Moreover, two problems that occasionally plague high-density data storage — registration and dirt contamination — are not significant obstacles to optical storage. The problem of registration — positioning the media correctly with respect to the read/write device — is alleviated by recording servo tracks on the media. These are

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## Brings More Than Storage Savings

# COM-Generated Fiche Tames Paper Monster

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HOUSTON — The DP subsidiary of First City Bancorp. faced a dilemma five years ago: How could it handle three-quarters of a million pieces of computer-generated paper each month and still concentrate on holding a competitive position in the financial marketplace?

First City Services, the wholly owned subsidiary of First City Bancorp., solved its paper problem by turning to computer output microfilm (COM). The bank's DP operation now has the Houston facility of Computer Micrographics, Inc. (CMI), a micrographics service bureau, convert the 750,000 pages of information from its IBM

370/155 mainframe to 10,000 original microfiche each month.

"If we had not begun to use COM-generated microfiche five years ago, we would have been overwhelmed by the cost of paper and dramatically suffered from the business we would have lost by not having a microfiche program," according to Ruel Ellis, vice-president of marketing for First City Services.

"Using microfiche for our computer-generated reports is now a necessity. When we make proposals to potential correspondent banks, one of the first things we are asked is if we use microfiche," Ellis pointed out.

First City Services, with centers lo-

cated in Dallas and Houston, is the DP arm for 21 member banks of First City Bancorp. and for an additional 29 correspondent banks. The company provides the 50 institutions with approximately 35 daily reports contained on microfiche.

These include trial balance, control summary, transaction journals and other reports for the installment loans, savings and demand deposit applications.

### Processing, Distribution

"Each of the 50 customer banks send us their daily work via on-line terminals or by courier. We process it during the night and then have the tapes

picked up by CMI. By 7 a.m. we have the reports produced on fiche and distribute them to the banks, which are as far as 70 miles away," Ellis explained.

The microfiche program at First City Services was designed to be flexible and responsive to the specific needs of the individual correspondent banks. "The software package that CMI developed for us allows daily alteration of the reports to be generated, including the grouping arrangement and the number of necessary copies.

A unique feature of our program is the indexing system," Ellis stated. "Since most of the reports are contained on one fiche, we place a large character visible to the naked eye on the frame before each report so a person directly can go to the one he needs.

"For example, the first frame on a fiche will have the number '1' on it and will be followed by the transaction journal report; the number '2' will be marked on the frame preceding the unposted items report and so forth. This system has made information retrieval for a specific report extremely efficient."

### Unexpected Advantages

The DP subsidiary has realized several important benefits from its COM program. "What basically began as a move to remain competitive, has provided us with several unexpected advantages," Ellis noted. "In addition to lowering our paper costs and reducing our storage requirements by 95%, we have benefited from intangibles — better use of our computer, for instance — since we reduced our printing time (25% of the banks' reports are on fiche). Not having to separate and collate the printouts has also been a significant advantage," Ellis said.

"At one point, we determined it took us as much time to handle the printouts as it took to print them. Now much of that is behind us.

"Our expenses for producing the reports on fiche have actually decreased as our volume has gone up. The same cannot be said about paper with its continually increasing costs," he added.

What have been the reactions of the 50 customer institutions to the microfiche program?

"Extremely positive," according to Ellis. "Because of the inherent efficiency of microfiche, having computer-generated reports on film has become a commodity that users now expect."

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# Neodata Volunteers to Be First CCD Disk User

(Continued from Page 85)

for producing the all-important mailing labels that help a magazine arrive at the right destination.

In fact, the company generates about 50 million subscription labels per month, Loeb said.

The subscription fulfillment company has linked STC's 11.2M-byte Model 4305 disk unit — the vendor's smallest configuration — to its IBM 3033 processor. Neodata's computer room boasts about 20 3350-type standard disk drives, a number of tape drives and a couple of IBM 3211 printers. Approximately 60 Model 3705 CRT stations are scattered throughout the building.

The firm has a "rapidly growing" Time Sharing Option (TSO) user net-

work comprised of both internal and a few outside customers. The DP director pointed out that this dependence on a multiuser TSO environment was part of the reason why the STC 4305 was selected; the unit's electronic switching feature reportedly facilitates fast, multiaccess transfer rates.

While the 4305 has been operational only for a few weeks and no hard performance figures will be available for at least another 30 days, the firm's TSO users have reported a significant response improvement with the device. "Everything seems to run faster — which I think you would suspect," Loeb commented, "but I don't know how to translate that into any useful numbers."

Although Neodata is presently satis-

fied with the disk's operation, the DP staff is mildly concerned about the unit's volatile memory, which maintains data so long as power is applied. In fact, STC recommends that the 4305 be used only with an uninterruptible power supply or in read-only applications.

"There's always the basic concern with a volatile memory as to what happens if we get a power drop, and some shift supervisors are more secure about that than others," Loeb said.

At this time, Neodata has no backup power system for the 4305 or its computer room except for a support facility for the 3033 processor that carries the mainframe through during brief power fluctuations. If the main power should drop, resulting in a loss of

4305-based data, then the operators and programmers would have to "go back to some point and restart," probably from job submission, Loeb stated.

The company's main mailing files are still contained on the standard 3350 disk units, so the TSO users would be the only ones affected by a daytime power loss on the 4305.

During the night, however, the three-shift computer staff coordinates long-running batch jobs that would involve a significant amount of wasted time should the power drop on the 4305. The unit is not used extensively at night, so it's really a "trade-off question," Loeb added.

## Why STC?

Neodata didn't really consider any other vendors, such as IBM, before selecting STC's CCD unit. According to Loeb, Neodata's systems programmers "took a pretty hard look at the device ... and recommended that the [4305's] performance improvement would be fairly significant."

STC's proximity to the subscription fulfillment firm did play heavily in the company's decision to acquire the device, the DP director admitted. "There isn't somebody sitting here holding on to it, but there are engineers in and out at regular intervals," he said.

Because Neodata is basically an engineering site, it has the option of returning the device within a specified period of time if the unit doesn't perform satisfactorily, an STC spokesman said. Although a number of DP and administrative plans are currently on the firm's drawing board, Neodata doesn't plan to install another 4305 disk or upgrade the present model.

## Handles Renewals, Invoices

While mailing labels are the subscription fulfillment firm's major concern, they are not the company's sole capital endeavor. Neodata also handles all of its customers' magazine-related subscription renewals and invoices that are shuttled to and from consumers.

This activity amounts to approximately 300 million pieces of mail per year — roughly 1.5% of the total annual U.S. correspondence.

In addition, the firm analyzes how well subscriptions are selling so that a circulation director can tell whether his magazine audience is reacting to specific advertising campaigns.

Besides its 1,400 employees in Boulder, Neodata has 700 workers in southwestern Ireland who create subscription data tapes on a series of Data General Corp. minicomputers and banks of CRT data entry stations. The tapes are periodically flown back to the firm's U.S. headquarters here and input to the IBM system with other subscription data.

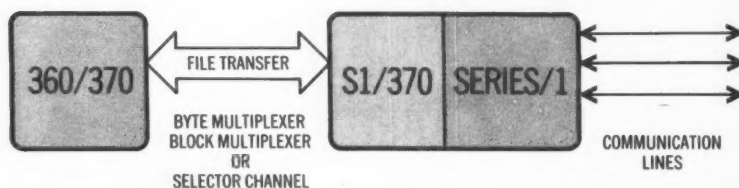
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## As Demands for Control Mount Hospital Gears Up to Handle Required Reports

RICHMOND, Va. — Hospital administrators have enough to worry about as they try to live with soaring operating costs, slipping employee productivity, increasingly complicated bookkeeping and criticism from people who feel hospital patients aren't getting their health care dollar's worth.

That's why a hospital here has already geared up its present DP system to handle the future onslaught of data entry problems — especially those connected with new federal controls and reporting requirements.

"We don't look forward to the controls and reporting demands with any degree of pleasure," John Simpson, executive vice-president and chief administrator of the 500-bed Richmond Memorial Hospital, said. "But we think we're pretty well equipped to cope with them in the least painful way, thanks to an extensive data base from which we can extract the necessary information and present it to outside agencies."

The hospital's current computer files and a group of innovative programs will simplify the collection of data for reports on the length of patient stays according to original diagnoses, bed utilization, employee productivity and other listings that will enable assessment of the cost-efficiency of the hospital operation, the chief administrator explained.

And, as a propitious side effect, getting geared up to handle the added reporting load will help the hospital perform its daily tasks more efficiently and cheaply.

"So the requirements aren't all bad, even though we tend to complain about them," Simpson conceded. "We knew we'd have to deal with the extra burden and the administrative staff and our DP people worked closely together to write new computer programs and adjust others so we could handle the work, and out of that effort will grow improvements in our entire operation."

"The information we assemble for various purposes will help me appraise the work of all departments in the hospital. I'll be able to use statistical reports to analyze what we're doing and come up with answers to such ques-

tions as: How do man-hours expended compare with productivity units? Do we have too many employees? Is new equipment warranted?"

### Recent Advances

Simpson's confidence in the hospital's DP organization is based on notable advances made in hospital data management during the past two years.

Using an in-house computer, rather than the resources of a computer service bureau, Richmond Memorial has drastically reduced manual functions in service departments, sped the flow of information among all departments, streamlined accounting procedures,

improved budget reporting and, in general, given administrators closer control over day-to-day operations.

Because of its success, the hospital is recognized in medical circles as a leader in the application of computer technology to health care administration.

Key administrators agree that Richmond Memorial has made the greatest advances in computer applications in the past 18 months. The beginning of that period coincided with the arrival of a new DP director named Emil Gallay, who believes that many of a hospital's administrative headaches can be cured with a generous application of programming.

At that time, the hospital used an IBM 370/125, which was dedicated primarily to financial management. More than 300 programs served accounting, billing, accounts receivable, general ledger, capital equipment inventory, payroll, cost analysis and budget reporting, accounts payable, materials management and several other applications.

Even though the system was doing its job well, Gallay felt that more applications were necessary to justify the use of such a mainframe in a hospital of Richmond Memorial's size.

Bolstered by outstanding support from upper management, he first in-

(Continued on Page 92)

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## DEC Users Gain Tape System

MAYNARD, Mass. — The TU77 tape system from Digital Equipment Corp. has a transfer rate of 200K byte/sec and was designed for Decsystem-10, Decsystem-20, PDP-11 and VAX-11/780 processors, according to the company.

The 9-track drive, with a 10.5-in.-reel capacity, features self threading and program-selectable, Ansi-standard phase-encoded or NRZI formats.

The TU77 consists of a tape drive and controller which can accommodate up to four drives. The tape drive/controller combination costs \$28,000, with additional drives available for \$19,500 each.

First shipments of the unit, which employs air bearings and ceramic guides for the tape, are expected in late summer.





## Aids in Inventory Control Mainframe Keeps Airline Supplier Flying High

BURBANK, Calif. — When a commercial passenger aircraft leaves the manufacturer's plant, it doesn't go directly to an airline. First, it has to be outfitted with seats, galleys, lavatory compartments and other equipment. To do this job for several airlines which use similar but unique parts and materials requires computers.

At the Weber Aircraft Division of Walter Kidde & Co., Inc., the computer has become as important as a screwdriver, a wrench or any other tool. The firm, believed to be the world's largest full-time supplier of interior hardware for commercial liners, counts foreign as well as domestic airlines among its customers. They supplied the company with \$60 million in gross sales last year.

Key among the systems the company runs on its computer is material requirements planning (MRP). The system, which serves both the main manufacturing facility here and a newer, 250,000-sq-ft facility in Texas, has helped the company to react quickly to schedule changes and to maintain much closer control over both material and work-in-process inventories.

The result is a major savings in inventory investment, plus fewer material shortages and a reduction in indirect labor expenses company officials said.

The company became interested in the MRP system when it was forced by

business conditions to examine its operations more closely, according to Fred K. Godfrey, company president.

"The products we manufacture are similar in each category, and in many instances there is a commonality of raw materials and parts," he explained. "However, each airline specifies its own unique trim, finish, color combination and other design variations. This creates a multiplicity of part numbers and data records, which greatly complicates the job of controlling both work-in-process and material inventories.

"For example, we now have more than 100,000 part numbers and 300,000 structure records, used in a bill-of-materials application, in our data base. Our problems are compounded by the fact that we are not able to purge our part and structure records periodically as many manufacturers do, but must keep them active indefinitely since our contracts require us to provide spaces throughout the service life of the aircraft," he pointed out.

"Add to these problems the tendency of the airlines to order with very short lead times and then change schedules after we have a sizable commitment to work-in-process."

### Coordinated Work

The computer Weber depends on is a 2M-byte IBM 370/148 running under DOS/VS. Attached to the system is a

network of 61 IBM 3277 CRT terminals, as well as Model 3340 and 3344 disk storage and several Model 3284 line printers.

In addition to the mainframe, the company has an IBM System/7 processor to collect production and labor data from the shop floor via a 2790 data communications system. The data collected through this system is input to the mainframe every night, so data on that system is never more than 24 hours out of date.

The system's contact with the actual work on the floor begins when an order for a part or subassembly is produced. Prepunched disbursement cards are created as well as "traveler" cards that accompany tasks throughout their histories from raw goods to finished products.

The disbursement cards help control the company's inventory of materials, while the traveler cards are used in conjunction with employees' badges to log in work orders at the workstations, providing information on job status and whereabouts, according to Robert V. Greenshields, Weber's director of systems and DP.

Weber's system currently handles between 700 and 900 shop order completions a day, with about 20,000 shop orders in process at any one time at the two plants.

One particularly valuable feature is the automated planning system. This consists of a production shop traveler

sheet that is produced by the computer along with the shop order.

This sheet, which follows the job as it progresses through the shop, lists all necessary operations in sequence and identifies needed material and parts, as well as required production steps and tools, Greenshields noted.

"The automated planning feature has brought about an additional saving in clerical labor costs," he said. "Previously, to produce these traveler sheets, a clerk had to pull a master copy of the planning sheet from a file and photocopy it to go along with the order, then refile the master."

### Recent Addition

A recent addition to the system allows the computer to keep track of the tools, such as dies workers need for parts fabrication. With a CRT, tool crib personnel can immediately pinpoint the location of any piece of tooling at either plant. "The system cuts down on tool loss and helps us save time looking for parts that have been charged out," he noted.

The system is so thoroughly integrated into the company's business that "without it, we'd be out of business," Greenshields said. "It gives us an even greater ability to redirect production effort where it is most needed and have maximum visibility of our total material requirements for our entire production backlog, which is now more than \$85 million."

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The CMC-32 goes far beyond IBM 270X emulation. An optional feature called Pollmatic moves SDA 11 polling into the CMC-32 and host polling overhead can be reduced to less than one-half of one percent of the host overhead without Pollmatic. An optional operator console permits on line system monitoring and

### DPF INTRODUCES THE CMC 32 360/370 TRANSMISSION CONTROLLER

diagnostics by allowing host commands, data, and status as well as data to and from a communication line to be traced in a real time mode. Being programmable, custom modifications to the DPF CMC-32 are easily accommodated.

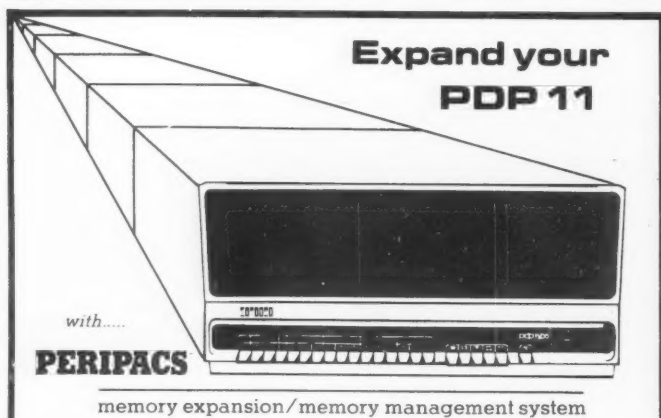
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## Hospital Gears Up to Face Future Data Entry Problems



Patient accounts are retrieved seconds after an inquiry code is entered in the accounts receivable section of the business office.

(Continued from Page 89)

vestigated what applications were needed most and then to check with IBM to see what program packages were available. Early in 1977, IBM's basic health care support software package was put into use to begin the period of rapid DP development.

The next decision was to change from a batch-oriented system to a teleprocessing system and move to a patient data base approach, using a larger and more powerful CPU that would accommodate extensive on-line applications.

Several such applications were contemplated, including patient registration and admissions, pharmacy order entry and inventory, laboratory management and appointment scheduling. When the hospital board approved this action, the DP department devised a long-range plan centered around the acquisition of a 370/138 and the IBM Customer Information Control System (CICS) and Data Base Language 1 (DL/1), a data base/data communications program product.

CICS and DL-1 were operative in October 1977, and the Model 138 was installed the following month.

Early in 1978, design of the new on-line registration and admissions system was started and four months later, the system went "live."

### Admissions System

Using information from the registration files, the admissions system permits rapid processing of admissions, transfers and discharges (ADT) and immediately produces notifications of ADTs at ancillary department offices.

On-line room and bed census is maintained, giving up-to-the-minute information on patient locations, bed vacancies and room assignments. The system also provides lists of patients by religion or by doctor upon request from clergymen or physicians.

The system has resulted in many benefits, according to Gallay. It has increased admissions staff productivity, cut the time spent on maintaining or verifying census reports, reduced typing and paper flow by having information available on CRT terminals and improved bed utilization because of reliable census information.

"Another important benefit is im-

proved public relations," he stated, "because when a patient makes his first contact with the hospital, he receives the impression that he's entering a well-run organization and that he's in good hands."

Gallay pointed out that more modifications are being made to broaden the admissions office application. "We are trying to automate the office as much as possible, and we hope soon to be automatically generating the patient charge plates. This is an area where we can save a lot of time."

"In addition," he continued, "we will work with nursing to maintain a more accurate bed census and with the dietary people to better coordinate patient load with food preparation. Through the system, the problems of a patient will be addressed from one source of information; it will, in effect, be a direct link between admissions and the medical records department, and better patient care is expected to result."

"Eventually, CRT terminals will be installed at other locations for retrieving bed occupancy and other patient information within seconds."

### Other Plans

Improvement of the admissions system and other procedures related to it is but one of the DP developments planned at Richmond Memorial. Other systems will include one that will bring pharmacy and nursing together with the storage of interlocking information.

"Our main objectives," Gallay noted, "are to be flexible and to keep abreast of systems that we can use with our expanded computer capability."

Stephen N. Wesby, vice-president for finance at Richmond Memorial, is enthusiastic about the computer's role in helping meet those objectives. "It's extremely difficult, for example, to manage a hospital's financial management system without DP."

"We must keep control over 30,000 accounts receivable that represent more than \$4 million in outstanding cash. We must issue paychecks to 1,500 people every two weeks—and they represent 90 different specialty occupations, all receiving different payroll treatment. We must maintain a complicated cost accounting system and manage our budget closely."



## For Basic, Cobol Programming

# Lear Siegler Adds Two Business Systems

ANAHEIM, Calif. — Lear Siegler, Inc.'s Data Products Division has unveiled two models of a small business system designed for large-scale programming in Basic and Cobol.

Both the 1000/4 and 1000/8 Data Systems feature a 16-bit

CPU with 32K to 64K words of dynamic random-access memory. They also offer a 10M-byte cartridge disk memory and one of Lear Siegler's 180 char./sec Ballistic bidirectional printers.

The 1000/4 and 1000/8 come with four and eight of the

vendor's ADM-3A dumb terminal consoles, respectively. All components are housed in a single wood-grain desk.

While many small computer systems require both the operating system and applications software to be resident in main mem-

ory, the Lear Siegler units maintain both types of software on disk and automatically bring them into the system in segments as required, a spokesman noted.

Two operating systems are available: Educational Data Systems, Inc.'s Interactive Real-Time Information System (Iris) and Information Processing, Inc.'s Business Language Information System (Blis) with Cobol.

The 10M-byte disk storage is half fixed and half removable. Up to four 10M-byte drives can be added optionally to the systems, the spokesman noted.

Prices for the 1000/4 and 1000/8 were not available. Lear Siegler's Data Products Division is at 714 N. Brookhurst St., Anaheim, Calif. 92803.

## With DEC-Type Instruction Set

# CA Offers Board-Level Mini Series

IRVINE, Calif. — Computer Automation, Inc.'s Naked Mini Division has announced a series of board-level minicomputers featuring up to 128K bytes of 550 nsec memory.

CA's Scout 4/04 supports multiple direct memory addressing and interrupt devices and carries an instruction set common to Digital Equipment Corp.'s LSI-4/10, a spokesman stated. Its standard memory capacity is 32K bytes, which can be doubled or quadrupled.

Aimed at applications in business, data communications, scientific research and process control, the Scout 4/04 includes a self-diagnostic capability on each board to allow prerun user checkouts of system components.

Both parallel and serial I/O are available with the Scout. Parallel

boards control paper tape and punch devices and act as a general-purpose 16-bit interface, while serial I/O acts similarly to support RS-232C communications.

Standard software includes Fortran, an assembly package, CA's Real-Time Scout Executive

(RTS) operating system and a communications subsystem.

A 32K-byte Scout with serial I/O (three boards with chassis) costs "less than \$1,000," about 20% under the comparable LSI-4/10, he claimed from 18651 Von Karman, Irvine, Calif. 92713.

# HP 1000 Memory, System Prices Cut

CUPERTINO, Calif. — Hewlett-Packard Co. has dropped HP 1000 main memory prices by 40% and cut total prices for the mini series by \$750 to \$1,000.

The cost of 1M of standard HP 1000 memory is now \$18,000; with error correction, it goes for \$23,000 — down from \$37,000. The price of 1M byte of high-speed (250 nsec cycle time) mem-

ory was cut from \$24,500 to \$22,000; that quantity of high-speed memory with error correction now costs \$26,000 — down from \$44,000.

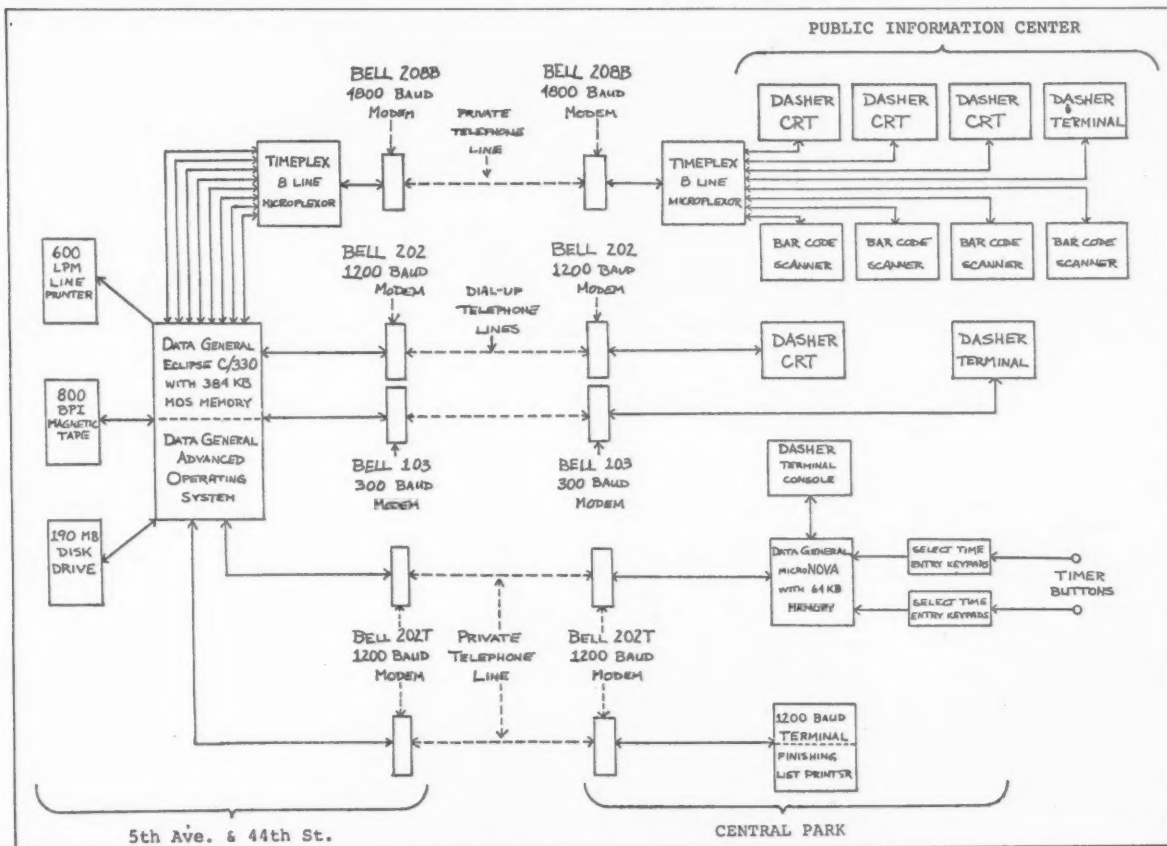
Reflecting the reduction of total system tags, the top-of-the-line HP 1000/45 with 1M byte of high-speed, error-correcting memory was reduced from \$82,500 to \$64,500.

All price changes took effect

June 1 and apply to orders already taken. OEM and volume-user discounts ranging as high as 38% are still available.

"Economies experienced by the HP Data Systems Division have made possible this price reduction in semiconductor memory," spokesman explained.

HP Data Systems is located at 11000 Wolfe Road, Cupertino, Calif. 95014.



## On the Sidewalks of New York

This hardware configuration scored the Trevira Ten Mile Twosome held recently in New York City's Central Park. See story on Page 94.

INTERNETWORK

## New York City 10-Miler

# A Couple of Minis Score Race for Couples

Special to CW  
NEW YORK — Without minicomputers, selecting the winning teams for the Trevira Ten Mile Twosome — a footrace for couples — would have been a statistician's nightmare.

Twosome winners were those male-female teams with the lowest combined times. More than 1,500 teams participated in the long distance race, held in New York's Central Park on April 28.

The computerized scoring procedure had four stages: data entry of runner times; collection of runner identification and finishing places; linkage of runner times with their identities; and the generation of a report of the final

results for the runners, press and public.

To implement the procedure, New York-based Personnelmetrics, Inc. developed a configuration driven by a Data General Corp. 64K-byte Micronova and a 384K-byte Eclipse C/330 minicomputer running under the Advanced Operating System. For three years, the management consulting firm has contributed such systems for Central Park foot races.

With push-button interrupt timers and Universal Product Code (UPC) bar code scanners that fed runner information directly to the Micronova, Personnelmetrics identified the winning teams as soon as they crossed the finish

line. Four of DG's Dasher CRT terminals gave race officials and the public a profile of each runner — a novel application for such devices.

Within the Micronova, located at the race site, a set of assembly language programs read runner times sent from the keypads, processed the data and transmitted it via a 1,200 bit/sec line to the Eclipse C/330, located at Personnelmetrics' midtown office.

The Eclipse checked this information for validity, recorded it on disk and magnetic tape and then "told" the Micronova to send the next message.

In the runner identification stage, bar-coded runner name tags were collected and individually scanned with

Computer Identics, Inc. UPC units. The scanners were linked directly to the Eclipse via a pair of Timeplex, Inc., M-8 microplexers and a 4,800 bit/sec phone line.

Within the Eclipse, a multitask Fortran program received data from the scanners, checked it for validity and recorded it on disk.

Personnelmetrics decided that finishing times and runner identification numbers should not be matched on a one-to-one basis; this would not allow for too many or not enough timer button pushes — problems that arise when several runners cross the finish line very close together.

The Eclipse was therefore programmed to discard excess time records and interpolate from incomplete record sets.

A public information center in a van near the finish line featured multiple Dashers programmed in the Idea language to let runners, the press and the public query the Eclipse.

Personnelmetrics' involvement with automated race scoring began with the 1977 New York City Marathon and has included the 1978 L'Espresso Mini Marathon, 1978 Marathon Tune-Up and the 1978 New York City Marathon, which featured more than 11,000 entrants.

## Desktop System Handles Teletype, FAX Messages

HAUPPAUGE, N.Y. — A desktop computer system offering both Teletype and facsimile reception in a unit that "makes electronic mail an economic reality" has been announced by Q1 Corp.

The Basic Office Machine can reportedly function as a language-independent teleprinter, intermixing — for example — English, Arabic and Chinese characters in a single transmission, according to the firm.

In facsimile mode, a spokesman said, it eliminates the need for attended operation, a major cost factor with the common drum-type facsimile machine.

Nonmechanical read-write external storage is reportedly provided for the first time by user-removable magnetic bubble memory modules. Furthermore, the horizontal mechanical motion of the carriage or print element normally associated with both impact and nonimpact printers has been eliminated, the spokesman said.

By eliminating the mechanical operation of disk drives and printers, he claimed, the Basic Office Machine is "more compact inherently faster, more reliable and less costly" than present options.

Initial deliveries of the system are scheduled for the third quarter, with volume production slated to start in the first quarter of 1980. With a standard internal semiconductor memory capacity of 32K bytes and one 32K-byte magnetic bubble memory module, it costs \$9,750.

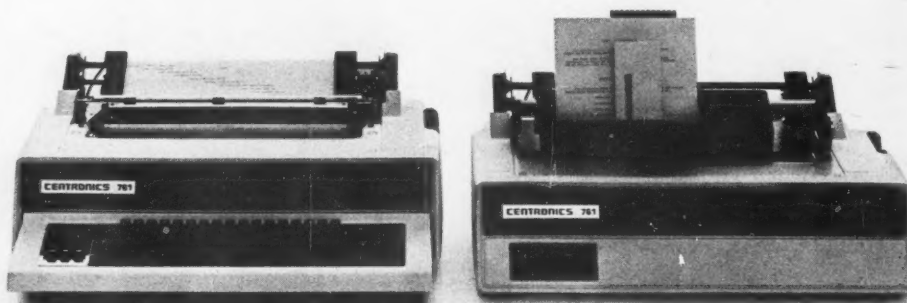
Q1 Corp. is located at 125 Ricefield Lane, Hauppauge, N.Y. 11787.

# Does increased forms handling flexibility make Centronics' teleprinters the best?

**NO.** Even though Centronics' teleprinters now offer front feed in addition to top or bottom tractor feed, pin

feed platen and pinch roll, they have much more than outstanding forms handling flexibility. Centronics teleprinters can accept data up to 9600 bps under software or hardware control and have up to 7K of buffering for increased host efficiency, faster system response and lower line costs. There's "smart" bi-directional printing at 10 cpi for 132 columns or 12 cpi for 158 columns. Bilingual printing selected from 64 character sets. The finest dot matrix APL character set available today. Microprocessor control. Simplified modular design for superior reliability and ease of maintenance. And KSR and RO models in desk top or stand-mounted units. All at the price of most popular 30 cps printing terminals.

And as with all Centronics matrix printers, line printers and non-impact microprinters, the 761 teleprinters are backed by the largest worldwide service organization of any printer company. For complete information write or call Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.



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## Claim Paper-Free Operation 'Fully Automated Office' Opens in Washington

By Jake Kirchner

CW Washington Bureau  
WASHINGTON, D.C. — Combining minicomputers, various types of word processing, micrographics and optical character recognition equipment and automated retrieval and telecommunications capabilities, Micronet, Inc. recently opened what it claims is the world's first fully automated office.

"The Paperless Office" is not only Micronet's headquarters but also a demonstration center and training facility for the company's clients. Micronet is a two-year-old management consulting firm in the field of office automation.

According to the company, the purpose of its new facility is "to utilize today's advanced office technologies in a fully integrated environment to demonstrate practical business applications." The Paperless Office is conspicuously located in the middle of the posh Watergate office, hotel and residential complex here. The site was chosen to make the company's services readily available to government executives as well as to representatives of U.S. and foreign firms, Micronet said.

The brainchild of Larry A. Stockett, Micronet's founder and president, The Paperless Office is an amalgam of approximately \$600,000 worth of office equipment leased "on a very nominal basis" from 17 corporate "sponsors." The sponsoring companies include Plessey Peripheral Systems, National CSS, Inc., A.B. Dick Co., ECRM, Inc. and the Qwip Division of Exxon Enterprises.

### Not Even a Note Pad

According to Stockett, Micronet has completely eliminated internal paper use and,

indeed, during a May 2 tour of the facility for members of the press, there was not so much as one note pad evident on the premises.

The only paper in the office is either incoming mail — which is immediately microfilmed or entered into a minicomputer through optical character readers — or outgoing correspondence, which is,

of course, electronically generated through various advanced word processing techniques.

This type of paperless operation can save the average company \$1 million in filing costs alone over a 10-year period, according to Stockett. He claimed the facility's automation allows Micronet's 10 employees to do the work of 50

people working for some of the companies by which he has been employed.

As part of its consulting services, Micronet offers two types of management training seminars:

- One-day "executive briefings" on corporate information policy, technology trends and the benefits of office automation.

- Two-day workshops on "technical planning for implementing office automation." These cover, the company said, "cost-effective applications; trends; when and how to use consultants; lease or purchase and in-house systems vs. service bureaus; facilitating delivery and installation; and how to implement,"

(Continued on Page 98)

## Ramtek Colorgraphics cover the spectrum.

When you need a color graphics terminal that's exactly right for the job you're doing, call Ramtek. Only Ramtek covers the spectrum in price, performance, options and resolution.

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## French Firm Easily Absorbs Shock Of Moving to Another Vendor

Special to CW  
GENTILLY, France — On the road to improved production control, a French auto parts manufacturer here has added real-time industrial applications to its commercial batch processing system.

What's more, the company developed the new capability without increasing the size of its DP staff or budget.

The Allinquant Co., a \$50 million corporation, is the major manufacturer of automobile shock absorbers in France. The company turns out five million shock absorbers a year with a labor force of 1,200 in manufacturing, research and data processing.

The firm's commercial applications had been processed on an IBM System/3 Model 15 until last fall, when Allinquant converted to a Data General Co. Eclipse C/330.

Twin configurations built around the C/330 processors were installed with 256K-byte memory, 192M-byte disk subsystems, 330- and 600 line/min printers, a fixed head disk and 15 of DG's Dasher CRT terminals.

The C/330 systems handle payroll, bookkeeping, invoicing, analytic accounting and sales statistics plus production and inventory control.

Allinquant developed the real-time applications to achieve optimal production control and to make more intelligent data capture directly accessible by the unsophisticated user, a company spokesman said. Allinquant is also installing CRT terminals in departments where paper overflow is a problem.

A variety of other applications, including treasury and order book control, was developed to put a complete picture of the organization at management's fingertips.

In the area of production control, the company is reportedly applying its new computer muscle to stock control, file management, pay orders, product launching and finished goods inventory control.

### Conversion Effort

The program to convert from the System/3 to the C/330 began in September

1978 and is now complete, the company said.

### RPG-II Used

The major part of the batch applications have been recompiled using DG's RPG-II programming language. Data conversion from one system to the other required a minimum of technical instruction, the spokesman said.

To facilitate the conversion, the company wrote programs in Basic and developed support programs for operating procedures, documentation and a number of utilities. The use of Basic was especially effective in the preparation of small, analytic programs designed to furnish frequent information on the levels of finished goods inventories.

## Business Unit Debuts

ORANGE, Calif. — An expandable computer system designed for use by small businesses is available to dealers, distributors and OEM manufacturers from Industrial Micro Systems.

The Series 8000 combines into a single unit components that were previously sold separately, according to a spokesman. Offered in a rack-mounted or tabletop version, the unit can reportedly handle up to 608K bytes of random-access memory at full capacity and accommodate a maximum of three 8-in. disk drives.

The Series 8000 including a desk enclosure, 32K bytes of random-access memory and two disk drives costs \$4,500 to \$4,600, the vendor said from 628 N. Eckhoff St., Orange, Calif. 92668.

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Mostek System Number	Minicomputer	Density Options	Special Features
MK 8001	PDP-11*	16K, 32K, or 64K words X 18 bits	Voltage options available
MK 8011†	PDP-11*	16K, 32K, or 64K words X 18 bits	Optional on-board parity generation and check.
MK 8005	LSI-11/2*	16K, or 32K words X 18 bits	Optional on-board parity generation and check.
MK 8009	PDP-8*	Coming Soon!	Can operate in the interleave and serial modes simultaneously.
MK 8601	PDP-11/70*	Up to two megabytes in a seven inch chassis.	Industry's highest density Nova 3 Add-in
MK 8003	Nova 3**	16K, 32K, 64K or 128K words X 17 bits	Optional ERCC
MK 8004	Eclipse**	16K, 32K, 64K, or 128K words X 16/21 bits	Configure one megabyte with three cards.
MK 8000	General Purpose	Up to 128K words X 24 bits	Industry's largest Add-on system.
MK 8600	General Purpose	Up to 5 megabytes in a 12 inch chassis.	

\* A trademark of Digital Equipment Corp.

\*\* A trademark of Data General Corp.

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## Weigh Less Than 10 Lbs

# Centronics Releases Printers for Small Systems

HUDSON, N.H. — Centronics Data Computer Corp. has released a seven-member group of printers priced as low as \$995 and aimed at the small systems user.

Two models in the 730 series were designed for North American users, four are aimed at European users and a seventh unit is going to Japan, a spokesman said.

Weighing less than 10 lbs each, all the 50 char./sec 730 models come with a built-in ability to handle multipart plain paper in any of three operator-selectable ways.

The printer's typewriter-style platen takes hand-fed 8.5-in.-wide sheets in letter size, legal size or longer lengths. International-size A4 sheets may also be used, the

spokesman noted.

Fixed pins on the platen automatically accept standard computer-grade multipart or single-part fanfold paper 9-in. wide from pin to pin, he added. This system also allows the use of 8.5-in.-wide roll paper up to 5 in. in diameter.

These paper-handling features allow the minicomputer user to perform a more diverse

set of functions from a single output device, the spokesman stated. Applications might range from payroll check generation on preprinted continuous forms and inventory listings on computer-grade fanfold paper to direct mail letters on cut sheets and general information on low-cost roll paper.

All 730s feature an 80-col.

line length at 10 char./in., a full line buffer and 7 by 7 dot matrix printing. The printers' print head makes up to three simultaneous copies possible, the spokesman continued.

Each printer has a built-in tear bar to allow tearing within five lines of print, which reportedly eliminates costly waste of regular paper or forms.

Other applications suitable for the 730s include electronic mail, message logging, technical and scientific data logging and reservation systems, the spokesman said.

Targeted for North America, the 730-1 and 730-3 offer parallel-interfaced and serial-interfaced 60 Hz performance, respectively. Both come with full upper and lower case Ascii sets.

The 730-2, 730-4, 730-5 and 730-6, which function at 50 Hz, will be marketed in Europe. Japan has the 730-7, parallel-interfaced at both Hz levels.

The 730 models 1, 2, 5 and 7 cost \$995 each. The 730 models 3 and 4 are priced at \$1,045 each, Centronics said from Hudson, N.H. 03051.

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**ECLIPSE**  
**LSI-11/2**  
**PDP-11**  
**NOVA 3**



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## Ledger System Debuts

BAINBRIDGE ISLAND, Wash. — A ledger posting system that succeeds mechanical ledger posting devices for such jobs as general ledger, payroll, accounts receivable and accounts payable is available from BRD Computer Systems.

The Small Fry system, reportedly well suited to the first-time computer user, is based on a Teletype Corp. Model 43 matrix printer with front feed and 10-key pad, according to a company spokesman. It prints 132 char./line on an 11-in. wide card at 30 char./sec.

The Small Fry uses program cartridges and is keyboard-programmable as well, the spokesman said.

The system with one software package costs \$7,000 from 12715 Miller Road, N.E., Bainbridge Island, Wash. 98110.

## Consulting Company Opens 'Paperless' Office in Washington

(Continued from Page 95)  
manage and set procedures for the system."

Stockett said a number of firms have already made use of Micronet's services and its paperless office facility. The office is booked solid for the next few months, he added.

Detailing the development of The Paperless Office, Stockett said Micronet made an exten-

sive evaluation of current office automation techniques and products and then approached companies about "donating" their wares to Micronet. Stockett said "it took us a long time to convince them" to sponsor the office and was quick to add that Micronet is not a manufacturer's representative.

Besides the obvious value of

the exposure their products get at The Paperless Office, sponsors are reimbursed with a certain number of invitations to use the Micronet facility, which the sponsors can give to prospective customers, Stockett explained.

To augment the on-site equipment, Micronet maintains an extensive library of office automation equipment catalogs for its clients' use, he continued, and the company constantly examines new product offerings with an eye toward updating its in-house systems. In addition, Micronet is under no obligation to necessarily recommend the particular equipment in use at its office, he said.

As for the equipment itself, The Paperless Office makes considerable use of microfiche, with computerized production, storage, retrieval, copying and output capabilities. The office features a number of minicomputer-based, stand-alone workstations for such functions as accounting, seminar reservations, information services, correspondence, data processing, market research and various customer services.

### Total Compatibility

The company is developing software interfaces to make all the equipment compatible, Stockett said. And many of the systems are already tied into a Digital Equipment Corp. PDP-11/34 with 80M bytes of on-line storage and 5M- and 10M-byte floppy disk units.

But the goal is not to create a completely on-line environment, Stockett said. In fact, the larger the organization, the less on-line capability is required, he said.

The Paperless Office relies to a great extent on its micrographics facilities. And Stockett himself is particularly keen on micrographics; he carries a brief-case microfiche display unit when he travels on business.

Looking to the future, Stockett said the company will continue to evaluate new product offerings and will replace the equipment now being used as office automation technology advances.

The facility uses only Cobol, Fortran and other high-level software languages to facilitate changing equipment, he added.

The Paperless Office is tied into the National CSS network and can access a number of on-line data bases. Stockett said he has also approached Satellite Business Systems, Inc., American Satellite Corp. and Comsat to discuss teleconferencing capabilities for The Paperless Office.

# The Harris fiber optics digital data link. It's fast, has room for 32, and gets great mileage!

If you're looking at digital data links right now, or will be in the future, fiber optics could be the ideal choice.

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## No Need for New Employees

# Mini-Based Unit Fills Pharmacy's Prescription

By Marguerite Zientara  
CW Staff

LEBANON, Pa. — Installing a minicomputer-based information system has saved a pharmacy here from hiring two employees to keep customer records and billing data up-to-date.

Many states require pharmacies to maintain patient profiles. It is expected that in the next few years federal legislation may make the procedure mandatory around the country.

To prepare for that possible eventual, McClellan's Pharmacy started investigating the world of automation for a computer system to keep track of its paperwork. After considering equipment from Texas Instruments, Inc., Infocore Corp. and Lear Siegler, Inc.'s Data Products Division, the pharmacy decided on the Lear Siegler Data System because "it met our programming needs and was less expensive than other systems," Ron McClellan, owner of the pharmacy, said.

"We wanted something with at least 10M bytes, we definitely wanted a 16-bit machine and at least 150 char./sec on a printer."

Because the pharmacy's recordkeeping process is complicated and because it planned to use the equipment for several other applications, "we wanted a minicomputer system that was programmable in Cobol," he added.

McClellan, who has been interested in computing "for some time" and wrote his own software for the system, said he got the idea for the Lear Siegler equipment from an advertisement in *Computerworld* which prompted him to contact the company.

The system was delivered at the end of October and has been "semioperational" since January. "It's taken my partner and me a little bit longer than I'd figured it would to enter all the drug information," McClellan admitted, but added, "It's working out very well."

### Medical Profiles

The computer is programmed to keep medical profiles on every customer. "Each time a patient comes in to fill a prescription, the computer will automatically check the profile for conflicting medication being taken or for conditions that prohibit the use of a certain drug," McClellan explained. "If there is no conflict, the new prescription will be added to the profile" in a procedure that previously was done manually.

The Lear Siegler VDP-1000 system consists of a 16-bit CPU, 32K words of random-access memory, one ADM-3A "dumb" terminal, a 180-char./sec bi-directional Model 310 Printer and a 10M-byte cartridge disk. Customized software was developed for the pharmacy by Harred Computers, Inc., a Lear Siegler distributor.

"Besides meeting potential legal requirements, the computer system was a very cost-effective acquisition," McClellan said. With four employees and a prescription volume of 4,000/mo, the pharmacy had planned to hire two more people. "With the time we will save using the system, I won't have to," he noted.

Thirty percent to 40% of the prescriptions are paid for by a third party

such as welfare or insurance companies. The turnaround time for receiving payment can be as long as two to three months.

"All of these third-party billing forms used to be filled out by hand, and many times the forms were returned unpaid because the handwriting was illegible or there was miniformation," McClellan recalled.

In such cases, the form had to be re-submitted, which resulted in waiting an additional two to three months for payment. "The VDP-1000 helps guarantee faster turnaround time because the forms are computer-generated, eliminating illegibility and incorrect data," he said, adding they are now

mailed out in less time as well.

McClellan's Pharmacy also uses the system to produce prescription labels and customer receipts. By entering the prescription into the terminal, the computer immediately provides the cost of the drug and reduces inventory, as well as checking the patient profile and adding the new prescription.

"We hope to add another terminal to the system in the near future," McClellan said. "The terminal we have now will be used primarily for filling prescriptions and checking and updating patient profiles."

"The employees who work on third-party billing presently have to use it on off-hours, but with two terminals,

both tasks will be performed concurrently."

McClellan has had "very little" trouble with the hardware, he said, but the usual "new product glitches" in the internal software. "No company can ever fully test out the internal software," he remarked.

The minor problems concerned the system's lack of cross-pack communication. "We couldn't run a program on Pack Zero and a file on Pack One," McClellan explained.

Lear Siegler fixed the problem immediately. "They've been very, very cooperative and have been very anxious to help us out with any problems we've had," he said.

## Small Business Systems Surveyed Microdata Reality Gets Top User Rating

Microdata Corp.'s Reality, Basic/Four Corp.'s Model 400 and the IBM System/3 models 6, 10 and 15 reaped the highest marks in Management Information Corp.'s (MIC) fourth annual small business systems users survey.

To assess how well small business systems are meeting users' needs, MIC polled 568 companies that use 689 small business CPUs.

Each respondent was asked to subjectively rate the vendors and their products on performance (whether stated equipment specifications have been realized), reliability (uptime vs. downtime), ease of use (amount of time necessary to train new personnel), service (maintenance) and vendor support (such as advance training and program assistance).

A four-point rating scheme was used (1 = poor, 2 = fair, 3 = good, 4 = excellent). The survey results were given as averages of the ratings assigned to each product in each of the five categories.

The Microdata Reality, Basic/Four 400 and System/3 Model 10 and Model 15 were the only small business systems to receive ratings of 3.0 or higher in all five categories.

Taking the average of all five categories, the Microdata Reality topped the field with

a score of 3.66 (based on 27 respondents using 55 units). The Reality earned 3.8 in performance, 3.8 in reliability, 4.0 in ease of use, 3.4 in service and 3.3 in support.

Based on nine respondents with nine units, the average for the IBM System/3 Model 15 was 3.6. This system was rated 3.6, 3.8, 3.6, 3.7 and 3.3 in performance, reliability, ease of use, service and support, respectively.

Eight users with 17 Basic/Four 400's gave that system an overall rating of 3.5. In performance, reliability, ease of use, service and support, the system was rated 3.5, 3.4, 3.8, 3.4 and 3.4.

Following this order, the IBM System/3 Model 10 was

rated 3.3, 3.5, 3.3, 3.3, and 3.3, respectively, by 34 users with 45 units. The System/3 Model 6 received 3.4, 3.7, 3.7 and 3.1 ratings in performance, reliability, service and support, respectively, by eight users with eight units.

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# Broker Puts Stock Into Mini-Based Network

By Marguerite Zientara  
CW Staff

NEW YORK — A financial brokerage firm here has realized a "net overall advantage of 50%" since it switched from a time-sharing network to an in-house minicomputer-based information system.

Lipper Analytical Distributors, Inc. (LAD), located in the heart of the Wall Street financial district, provides eight different hard-copy reports weekly to more than 400 fiduciaries, including boards of directors and managers of investment companies, banks, insurance companies, corporate pension funds and foundations.

The major portion of the research required to produce the eight reports is primarily of a statistical nature and can

be classified as either performance measurements or portfolio analyses, according to President Mike Lipper.

"Many investment managers live and die by our data," Lipper claimed, adding, "A mistake on our part could have tremendous economic implications for key individuals."

Because the firm handles approximately 500 funds, 500 weekly net asset values and 1,500 different dividends per year, computerization seemed like a logical step for the business right from the start.

## False Start

"In 1972, we had our reports produced by a service center with an IBM 360/50," Lipper recalled. "Then, in 1977, we progressed to a 370/158

through a time-sharing network."

Neither approach satisfied Lipper's needs. Service bureau costs were high, turnaround time was slow and manual error-checking compounded the problem. "Even with the computer, we spend more time on error-checking than on actual calculations because of the extreme importance of accuracy in this field," Lipper noted.

When the firm went to time-sharing, it hoped to gain a degree of in-house control. Instead, "there were real problems on the phone lines, and the computer kept going down; we were continually losing processed data," he said.

"Furthermore, the expensive nature of time-sharing — every time you do something, the meter runs — prohibi-

ted us from developing new products, as well as from running custom jobs for clients."

Perhaps even more critical than unreliability, delays and high costs, however, was the effect of such uncertainties on the company's employees. "To have to go all the way back to almost the beginning of a job when people had already put in a very long day and were prone to operator error was very nerve-racking for our staff," Lipper said. "The tension was just unbearable, and everyone became very nervous."

## Turning the Tide

Early in 1978, Lipper placed an order for an IBM System/34 in hopes of improving its tense situation. "It was not only to gain extra time," he noted, "it was the flexibility and convenience of it. Besides, the costs were just eating us alive."

After the order for the System/34 had been placed, Lipper received a call from a Wang Laboratories, Inc. salesman, inviting him to consider what Wang had to offer. Within six weeks, Lipper had cancelled his IBM order and bought Wang's VS computer system. Outside advisers were consulted in making the final decision, which hinged on Lipper's need for expandability.

"Another tremendous advantage of the VS over the System/34, from our standpoint, was the use of hard disks as compared with floppy disks," Lipper said. "With the System/34, we would have had to use at least 20 floppies just to get our product going, and probably an additional 10 to 15 more to bring in specials and new data banks. The expandability was not there."

Lipper's basic system is written in Cobol. "We were surprised that the VS actually supported this Ansi-level Cobol better than IBM," he said.

Also, according to the firm's DP manager George Kokell, "the VS utilities were far superior to IBM's, for example, in sorting."

"We perform a tremendous number of sorts, which can be handled much more easily with the VS than with the System/34," he noted. "Furthermore, we realized the VS' compatibility with IBM Cobol would allow us to convert our existing software easily."

On-line interactivity resulting in simplicity of programming, ease of operation and economy were also ranked high on Lipper's list of features influencing the ultimate decision. LAD's VS system is comprised of 128K bytes of main memory, two 75M-byte disk drives, a CRT console, a CRT workstation and a Model 2263 600 line/min printer.

Most of the report content presently on the VS is taken directly from the Wang printer, reduced in size and published as is, Lipper noted, with the rest to go on-line "shortly."

In evaluating the system, Lipper noted, "although the dollar savings are real, I don't think we'll ever truly quantify them. What we've done is gone from a passenger car to a truck — not a Mercedes. A Mercedes just makes you feel better, but doesn't do anything more for you. The truck allows you to have a bigger payload — not only larger, but a different type."

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## For Construction Company Mini Designs Buildings, Calculates Their Cost

Special to CW  
GRAPEVINE, Texas — A computer system that designs buildings and estimates their costs has been the foundation of a growing business for one construction company here.

Mesco Metal Buildings Corp. is a \$25 million manufacturer of preengineered metal buildings. The company markets its products to professional builders in the Southeast and Southwest.

Mesco harnesses the power of an interactive Prime Computer, Inc. Model 500 minicomputer to meet the engineering and cost-estimating needs of its customers. The mini also juggles a dozen internal chores from payroll processing to sales forecasting.

The Model 500 configuration includes 512K bytes of main memory, one 300M-byte storage module disk drive, one 80M-byte storage module disk drive, one 600 line/min printer, one card reader, one Zeta Research, Inc. plotter and 18 terminals. The chief advantage of all this horsepower is faster customer response time, according to Randy Cunningham, director of management information systems.

### Fast Price Quotations

Builders who specify the increasingly popular metal buildings — which cost less and go up faster than wood or brick buildings — can have a computer-generated price quotation from Mesco in a matter of hours.

Sometimes a builder can figure his cost for a standard building by referring to a Mesco price book. But most buildings today are not standard, so a factory quote is needed, Cunningham said.

To obtain a quote, a builder calls Mesco headquarters here and talks with an estimator. He gives the estimator a building description, which may be a detailed specification, but could be nothing more than overall dimensions.

The estimator writes all the information on a computer input form, then types the data into an I/O device, either a Hazeltine Corp. 1510 or one of various models of the Texas Instruments, Inc. Silent 700 series.

### Calculating the Price

To calculate a quote, the Prime 500 constructs a list of all necessary components and labor costs. For standard items, it simply selects the correct list price. For nonstandard components, the computer makes estimates based on extrapolations from similar standard parts, using precise estimating formulas.

A quote requiring preliminary engineering analysis may take several hours to compile, but most take considerably less time. The complex price calculations that take two to three minutes on the Prime 500 would require three to four man-days to complete, Cunningham said.

Mesco has been using its computer price quotation system for about 10 years. "We've grown to trust the computer, even when it produces a quote that disagrees with our usual experience," Cunningham said.

For example, the mini will automatically increase the estimate for a job requiring an unusually high number of welds. The system reduces the estimate if it finds that many duplicate parts are

used, and a discount is automatically applied based on the total weight of the shipment.

### Accounting for Inflation

To account for future inflation of raw material prices, the system checks how long it will be before the job will be delivered. Freight cost is calculated, credit risk is evaluated and the final quote is neatly printed on a single page.

"On a competitive job, the computer can be told to reduce profit margin, and it does that in a very orderly, precise way so we still know exactly where we stand on the job," Cunningham said. "The computer turns out quotes faster than the competition."

Mesco has used computer systems since 1963 when the company replaced its outside data processing service with an IBM 1620. In 1974, Mesco went online with a Digital Scientific Corp. Meta/4, but business was outpacing the capacity of even that machine.

Last year, Mesco installed the Prime 500. Cunningham figures the system will grow with the company for another five years, although he is already planning an upgrade in primary and secondary memory next year.

### Engineering Application

Engineering — designing the steel-frame structure of a building — is the second critical customer support application of the system.

The 500 works with limited information or from a comprehensive set of specifications to design the basic frame, including the number and spacing of frame members, whether or not additional support columns are needed and, if so, how many and where. The computer also defines the precise structure of individual frame members to yield the strongest structure for the required space at the least weight.

Member design application is a demanding program, but one that is ideal for the system's virtual memory, Cunningham said.

### Internal Support

The 500 handles internal support jobs as well as customer applications. In its interactive mode, the system:

- Writes payroll checks for 600 employees.
- Maintains order entry and backlog records.
- Tracks material issue and inventory.
- Collects and summarizes job-cost data for labor and materials.
- Creates shipping lists and costing reports.
- Schedules manufacturing jobs.
- Provides a library of engineering programs in a "calculator" mode.
- Controls the transmission of text messages between headquarters and one manufacturing plant.
- Processes labels and mailing lists for direct mail advertising.

In batch mode, the system handles the general ledger, accounts receivable, accounts payable, financial ratios and analyses.

A sales documentation system on the computer tracks key sales performance indicators by individual builder, Mesco sales manager, territory and

building type. The program tracks quote activity, computes sales commissions and issues regular reports to builders.

The system also generates an annual market forecast. Before the start of the year, annual metal building sales data for the whole country broken down county-by-county is fed into the system. The computer constructs detailed sales forecasts for Mesco as well as for

the company's competitors and projects sales for each company by county.

The result is an industry model used to plan Mesco's marketing strategy and to evaluate itself against the competition. "We do tend to react more quickly than other firms," Cunningham said. "The company management is responsible for that, and it has a lot of confidence in what we do."

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## Cache Speeds DEC PDP-11

ST. PAUL, Minn. — A cache memory that is said to speed up the Digital Equipment Corp. PDP-11/34, PDP-11/35 and PDP-11/40 has been announced by Minntronics Co., Inc.

The cache has 4K of 25-bit memory that can store 8K bytes of data, a company spokesman said.

The cache incorporates a parity error circuit with LED indicators and a Unibus addressable CSR that allows the cache to be turned on and off from the front panel.

Diagnostic software is also included in the price of \$4,385. Minntronics is at 2599 White Bear Ave., St. Paul, Minn. 55109.

## Datapoint Offers Lease for Model 1500

SAN ANTONIO, Texas — Datapoint Corp. has presented a leasing policy for its Model 1500 Dispersed Processor and a special package price for the 1500 and a matrix printer.

The 1500 Dispersed Processor was designed to meet the data entry, processing and communications requirements of dispersed business locations, Datapoint explained. It includes 32K or 60K bytes of user memory, up to one million bytes of diskette storage, a keyboard and a 1,920-char. CRT.

Under the leasing plan, the basic 1500 with 32K bytes of user memory and 500,000 bytes of diskette storage may be acquired for \$195/mo on a three-year contract. One- and two-year leases and maintenance contracts are also offered.

Datapoint's 160 char./sec matrix

printer can be purchased with the 1500 for \$8,495, including the necessary connecting cable. The processor/printer package can be leased for three years at \$270/mo.

Quantity discounts and one- and two-year leases and maintenance contracts are also offered for this package.

The 1500 features an integral communications interface that permits

auto-answer operations when connected to the appropriate modem, a spokesman said. Software includes Datapoll for interprocessor networking operations, TTY for emulation of the standard teletypewriter protocol and emulation packages for IBM's 2780 and 3780 line disciplines.

Datapoint is at 9725 Datapoint Drive, San Antonio, Texas 78284.

## Feature 16-Bit Words Micros Aimed at Teachers

COLUMBIA, Md. — A line of 16-bit microcomputers tailored to the needs of educators is available from Technico, Inc.

The Educator 900 series is offered in

three levels, ranging in price from less than \$1,000 to almost \$6,000. All Educators are based on Technico's T99SS MPU module and its associated Dual-61 bus system. Each model comes with a power supply and is ready to operate as delivered.

The low-end 910 system is packaged in a 19-in. rack-mount chassis with six-slot backplane. A firmware package provided with Technico's 9900 CPU module includes the vendor's Mighty Monitor, Instant Input Assembler and 2K bytes of Basic.

An RS-232C I/O port is offered with the 9900 for terminal communications.

The Model 920 is contained in a tabletop chassis and features 8K bytes of user random-access memory, 16K or 32K bytes of erasable programmable read-only memory and a video interface module. The latter provides several I/O functions such as audio cassette interface, microphone input, 8 ohm speaker output and solid-state ac power relay, Technico explained.

An Ascii keyboard comes with the 920, offering an LED display, an 8 ohm speaker and microphone input jacks.

The top-of-the-line Model 930 has all the 920 features plus a 32K-byte memory and dual floppy disks with controller, Technico said. Super Basic, character editor, assembler and relocatable link loader are standard with the 930; Ansi Fortran IV comes as an option.

The 910 and 930 Educators cost \$895 and \$5,895, respectively. Technico is at 9051 Red Branch Road, Columbia, Md. 21045.

## System 730 Gets More Terminals

SANTA ANA, Calif. — Basic/Four Corp. has doubled the terminal capacity of its System 730 commercial computer and reduced that system's price by 14%.

The 730 can now accommodate 32 terminals.

The price of the 730 has dropped from \$110,000 to \$95,000. The base system reportedly consists of a 96K-byte memory, four CRT terminals, two 75M-byte disks and a 300 line/min printer.

Deliveries of more than 16 CRTs are slated to begin after March 1. A 9.2M-byte tape cartridge drive is presently available as an option.

The enhancement and price slash came shortly after the announcement of similar changes for Basic/Four's System 610 business processor [CW, May 7]. Basic/Four is at P.O. Box C-11921, Santa Ana, Calif. 92711.

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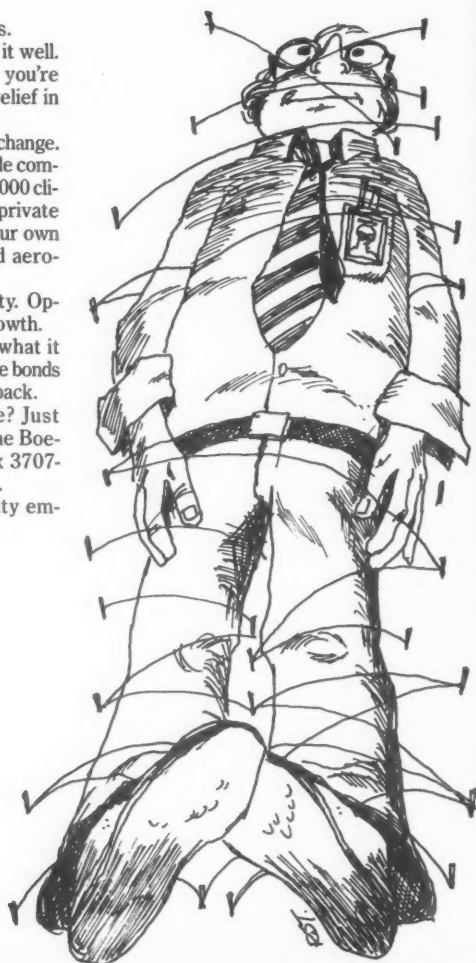
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## From IBM to Wang

# Presto Changes Vendor, Cuts Turnaround Time

By John Whitmarsh  
CW Staff

KANSAS CITY, Mo. — When demand for its nondairy toppings whipped annual sales up to \$8 million last year, Presto Food Products, Inc. enjoyed the sweet taste of success.

But things could turn sour, company executives knew, unless the firm here improved its production control data flow and quickly automated its financial, sales and inventory reports.

"We had to do something fast," said Steve Allen, data processing and production control manager at Presto, the second largest producer of private-label whipped toppings in the country.

Presto had been pooling DP resources with a nearby company. Allen arranged to move the IBM System/3 into Presto headquarters and, in exchange for use of the equipment, to pay the hardware owner a nominal fee and to provide free DP services.

But this arrangement was disrupted when the owner of the equipment moved to new quarters and took along the computer. "I was pressed," Allen recalled. "I had to rent, lease or buy a machine fast."

He bought. Allen decided to relinquish the IBM System/3 for a Wang Laboratories, Inc. VS computer with two 10M-byte Wang 2260-V disk drives, three Wang 2249V-6 CRT workstations, a Wang 2246S master console and a 600 line/min Wang 2273V printer.

"It was a change for us to go from batch processing to CRTs," Allen said. "Previously we had one person who knew how to work the DP system. Now all the people in the office can enter their own work and take care of their own problems."

### Turnaround Savings

Turnaround time was critical for Presto as the company struggled to meet increasing demand for its products. "Sorting a file on the System/3 took about 10 minutes. On the Wang it took 30 seconds," Allen noted.

Compiling time also dropped. "I sent all of my source decks to Wang and it converted them from Ebcidic to Ascii. Wang also made very minor changes between the System/3 and the Wang RPG. My compile time dropped from five minutes on the System/3 to 15 seconds on the Wang," Allen said.

One important document that Allen turns out every day is a metered inventory report. Metered inventory records the amount of ingredients before and after a batch of whipped topping is mixed. A significant shortage of a single ingredient tells Allen that the batch was improperly mixed or made with the wrong oils.

A raw material inventory record is another report Allen uses. Presto stocks more than 360 different items, from liquids to powders, from plastic bowls to aerosol cans. The daily inventory report continually monitors the stock levels of these items and keeps the purchasing agent up to date on inventory levels.

Closely related to the daily inventory report is a daily production report. The inventory report tracks supply levels, while the production report monitors shop floor activity. The production report gives details of the number of

batches processed, the number packaged, the number held over from one day to the next and the number scrapped.

"The computer lets us react on a daily basis to the orders and raw materials we receive," Allen said. "We enter each report as it comes in, and every afternoon I get a report for every in-house order we have compared with inventory on-hand."

"Our production reports are current up to one o'clock the previous morning. Under the old system, our reporting was two or three days old."

The VS has been programmed to generate more than a dozen different hard-copy sales analyses. Allen has set

up a standard system for costing new products.

Working from a bill of materials and using prices of raw material, labels and packaging, the computer factors in data on machine speeds and computes the cost to produce new formulations.

In addition, the VS is used to run a profit-and-loss statement on every customer, broken down by items and by market segment.

### Next Step Obvious

Meeting the demands of Presto's expanding production capacity will require the development of a material requirements planning (MRP) system.

"An obvious step for us and the VS

will be to project production from historical sales records and play it against raw material inventory to tell me my material requirements — what I need to order and when," Allen explained.

Allen would also like to put a pricing program on the VS to allow for customer promotions and discounts.

Allen suggested using the VS for a unified pricing and billing system to be tied into the pricing program.

Allen plans two system extensions. First, he wants to install a teleprocessing link between Presto headquarters and the company's food research laboratory. Second, he plans to link headquarters and his storage warehouse across the city.

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site staff members, their productivity—when compared to traditional methods—increased three to four fold! That's centsible.

There's still more. NASA is saving time and money in their space shuttle program by having SYSTEM 2000 handle tedious projects such as inventory control, problem reporting, documentation control, and other tasks which previously were labor intensive, cumbersome and inefficient.

Seven years ago, Ford Motor Company's Ford Parts and Service Division installed SYSTEM 2000 to track packaging specs and bill of materials information for over 200,000 different types of parts. (These parts are stored in the Ford Parts Redistribution Center which has over 3,000,000 sq. ft. of warehouse space and in 21 Ford Parts Distribution Centers which have 6,100,000 sq. ft. and are strategically located throughout the United States.)

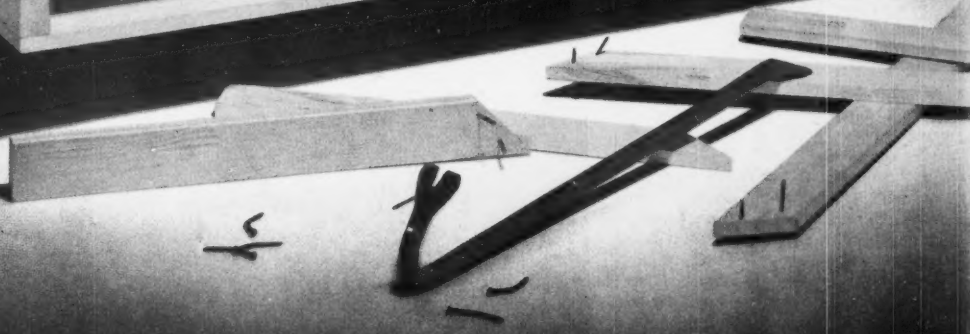
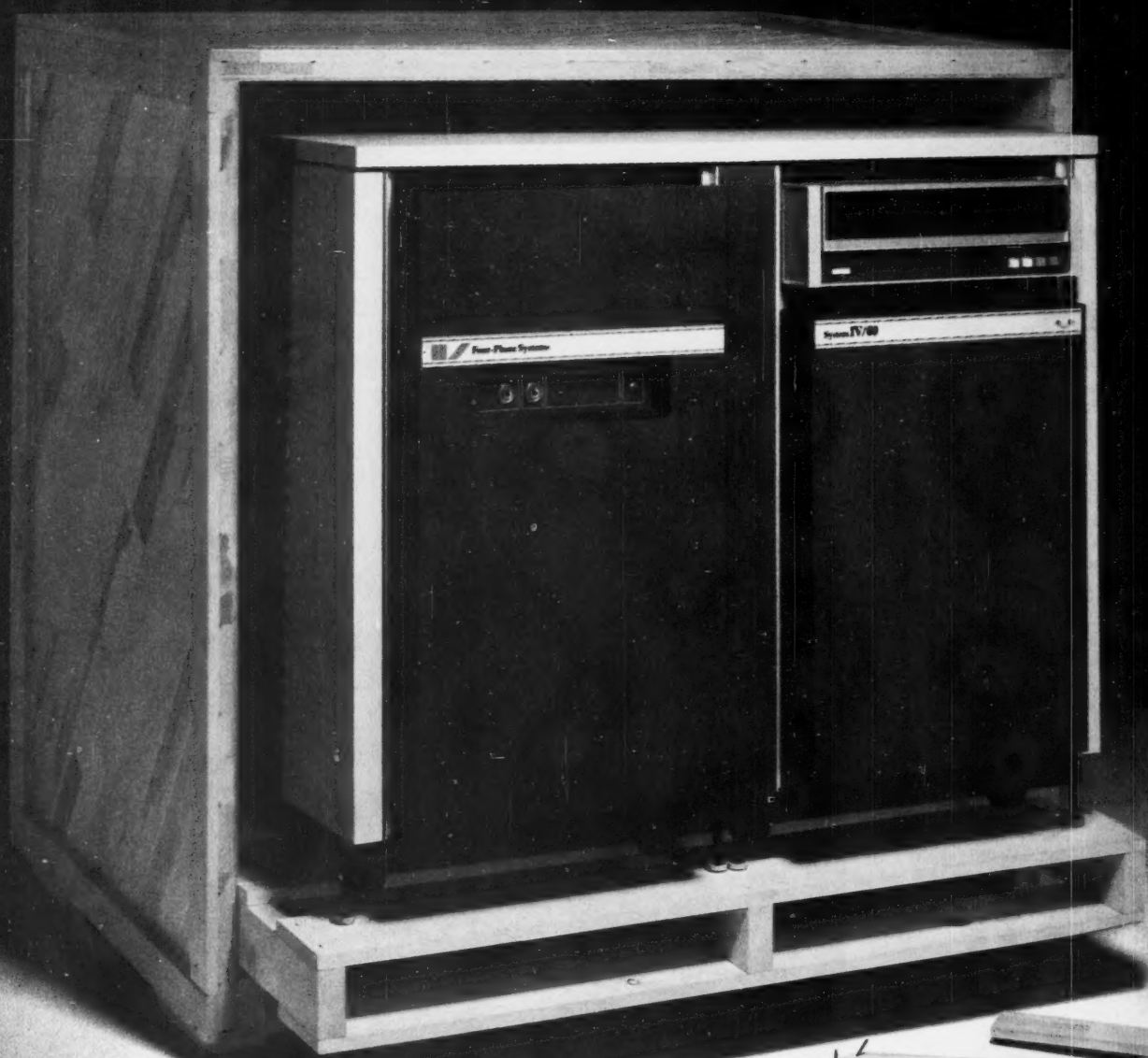
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## After Time-Sharing Costs Pile Up, Firm Installs First NCSS 3200

By Marguerite Zientara  
CW Staff

LOS ANGELES — A compensation and benefits consulting firm, seeking to eliminate \$200,000/year in time-sharing costs, gained versatility and communications capabilities besides by installing its own minicomputer-based DP system.

After considering equipment from Prime Computer, Inc., Harris Corp., Digital Equipment Corp., Hewlett-Packard Co. and National CSS, Inc. (NCSS), Olanie, Hurst & Hemrich (OH&H) became the first purchaser of an NCSS 3200 computer system, which was announced in April 1978.

The major reason for the firm's choice was the 3200's operating system, according to Phillips Baily, OH&H princi-

pal. "We had been using time-sharing for the work we do, and we were used to instantaneous response and being able to have the computer at everybody's fingertips," he said.

### Not Normal User

"We're not your normal user," Baily remarked. "We don't use the computer for things like payroll and inventory." Instead, the firm uses the computer for actuarial consulting, calculating the costs of retirement plans, administering OH&H client retirement plans and planning accounts and finances.

The firm is constantly writing programs to edit and reconcile employee data, to calculate the cost of pension plans and to update employee benefit records. "Ease of use is important to us," Baily said, "because most of the 20 people who use the system are actuaries and retirement plan analysts." The firm does not have a DP department with a large programming staff.

Since OH&H uses Fortran for its actuarial studies and calculations and Cobol for its large retirement plan administrative systems, "versatility was an important factor in our decision," according to Baily.

Besides an interactive system capable of supporting very large data bases, he explained, OH&H needed the NCSS network capability to link its office here with its office in San Francisco. In addition, the company's Seattle and Portland offices will be put on the

network shortly.

The NCSS 3200 was installed last November. "The transition from a remote computing firm was very smooth," Baily said, partly because OH&H made considerable use of NCSS' service "hot line" for the first few weeks.

"The [NCSS] service people in Connecticut were able to handle all but two or three problems over the phone," he noted. "Because of the communications capability on the machine, if we have any problems, the systems designers in Connecticut can look right at our computer through the phone line."

One of the factors aiding the transition was the use of the NCSS remote computer service network before the 3200 was delivered. "Using the network allowed us to shake down a large percentage of our systems well before the 3200 arrived," Baily noted.

The NCSS 3200 at OH&H includes a Model 3216 CPU with 1M byte of memory, two selector channels and a 1-byte multiplex channel. Peripherals include a 1,000 line/min printer, three 200M-byte disk drives and two 75 in./sec tape drives. There are eight on-line CRT and teletypewriter terminals and four dial-up lines.

Software includes the VP/CSS operating system, Fortran, XBasic, Cobol and Nomad, the NCSS proprietary data base management system, and application development tool. A monitor subsystem continuously measures and reports on performance.

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## Disk Controller Gives Boost to DG Nova 3

ANAHEIM, CALIF. — A microprocessor-based disk controller for use with the Data General Corp. Nova 3 series CPU via intelligent control of storage modules has been introduced by Mini-Computer Systems, Inc.

The Model 2603 disk controller is said to relieve system overhead, improve throughput and enhance I/O reliability.

The unit reportedly provides hardware/software compatibility for the Nova 3 series with the following devices: Control Data Corp. models 9760, 9762, 9764 and 9766 storage module drives; CDC models 9448-32, 9448-64 and 9448-96 cartridge module drives; and CDC models 9730-12, 9730-24 and 9730-80 minimodule drives.

The disk controller consists of a Formatter Control printed circuit board (PCB) in a chassis with an independent power

supply and associated controls/indicators; an Interface Adapter PCB imbedded in the Nova CPU; and cables for interconnection of the chassis to the formatter adapter PCB as well as one to four disk drives.

The controller is said to optimize seeks for each drive by reordering the I/O requests by the closest cylinder. The unit also permits up to three bad tracks and automatically provides alternate track assignments.

The controller will queue up to 16 tasks and subsequently execute them in sequential order, the spokesman said. This minimization of execution time operates in conjunction with the "Optimized Seek" function.

The Model 2603 costs \$6,700 in OEM quantities.

Mini-Computer Systems Peripheral Equipment Division is at 2259 Via Burton, Anaheim, Calif. 92806.



## TRS-80 Supplants Altair West Coast Faires Differ Markedly

By Jim Edlin  
Special to CW

The rapid evolution of the microcomputer industry was made very apparent by the differences between the fourth West Coast Computer Faire, held this May 11-13 in San Francisco, and the first Faire held two years earlier. Perhaps the most startling difference between the two events was the total absence of any Altair brand computer at the recent Faire.

Two years ago, "Altair" was almost a synonym for "microcomputer." The Altair's manufacturer, Mits, Inc., was a dominating presence at the Faire.

Many other exhibitors at that first Faire also had Altairs as part of their display, either because they sold them as retailers or be-

cause they sold products meant to be used with Altairs.

Of the remaining exhibitors, many were selling products meant to be improved but still recognizable versions of an Altair or products that were electronically compatible with what was then called, as often as not, the Altair Bus.

In two years, with Mits having been acquired by a larger company, Altair has descended into total invisibility on the Computer Faire scene.

Mits' buyer, Perlec Computer Corp., abandoned the Altair name. It also seemed to have abandoned the idea of exhibiting its products at that kind of event. Not one dealer or manufacturer was there to invoke its name.

While many products on ex-

hibit were designed for what is now firmly christened the S-100 (nee Altair) bus, it was clear that their sellers expected them to be used in something other than an Altair.

### Pretty New Face

Replacing Altair in visibility at the show as the TRS-80 microcomputer from Radio Shack, which had not even been announced at the time of the first Faire.

It seems to be widely held in the microcomputer industry that this device is no more than the "Trash-eighty." But that sentiment doesn't keep many people from recognizing where the bread is most likely to be buttered.

Thus, nearly every third exhibit

booth seemed to have a TRS-80 on display for the demonstration of whatever hardware or software the exhibitor was selling for it. And if an exhibitor didn't have a demonstrator, it had some kind of sign in which the phrase "TRS-80" was a prominent element.

Another dramatic difference between the two Faires was the greatly increased number of software vendors at the recent show. At least half the exhibitors at the latest Faire seemed to be selling software, either to the exclusion of everything else or as the most important of several products.

Many of the exhibits were quite obviously one-person entrepreneurial ventures — the software and the sign on the booth were the product of the same hand, which was the hand that shook yours when you stepped up to the booth.

Yet there was an impressive selection of products such as the menu-oriented complete business package from Aaron Associates of San Clemente, Calif., that were often sophisticated. Some were quite imaginative; Dorsett Educational Systems of Norman, Okla., which produces educational program tapes complete with audio narration, animated color graphics and interactive questions, is also busy transmuting its library of more than 1,000 classroom film strips into computer cassettes.

Other products were very well packaged and presented; the G-2 Division of GRT Corp., for example, has obviously taken some merchandising cues from its music-tape-selling parent.

In the closed-off suites meant for dealers only, upcoming products of even greater ingenuity were demonstrated. A kind of "intelligent blackboard" previewed by Personal Software, Inc., of Sunnyvale, Calif., allows even naive nonprogrammers to do "what-if" manipulations of all sorts of tabular figures effort-

(Continued on Page 109)

## Talented Kids Strut Their Stuff At Massachusetts State Science Fair

By Jay Woodruff  
CW Staff

CAMBRIDGE, Mass. — High school science fairs seem to attract students whose project titles often sound more like doctoral theses than the work of budding scientists.

And an increasing number of students at this year's Mass. State Science Fair showed up with computer systems, either as the focus of their projects or as an aid to their completion.

Impressive titles like "The Effect of RSTS Batch on System Performance" and "Computerized Energy Auditing" took their places along other such forbidding titles as "The Viscosity of Non-Newtonian Fluids" and "The Effect of Radiation on *Drosophila Melanogaster*."

The competition was held in a large exhibition area at MIT. Computer-related projects ranged in sophistication from Bonnie Trieber's "Reading Computer" display to Eric K. Olson's "Personal Computing for the Blind."

Trieber, a bright, outgoing sophomore at Boston Latin High School, decided to do her project because "I wanted to learn something about computers." She constructed a model of a reading computer, complete with a schematic of the circuitry involved, to illustrate how a CPU recognizes numbers and displays them.

"The relation of this model to a reading computer capable of reading about 3,000 char./sec is about the same as that of a Fourth of July firework to a modern rocket," she admitted, adding that in spite of the disparity between her model and the real thing, the project took some of the mystery out of the subject.

Olson was not present at his display, "Personal Computing for the Blind," but an extensive logbook of his progress through

the project and a typewritten account of his goals were left alongside a Radio Shack TRS-80 microcomputer interfaced to a Texas Instruments, Inc. Speak and Spell.

### Organized Approach

His project revealed an organized and enterprising approach to making a computer useful for someone who can't see a CRT or read the output of a printer.

"By entering commands through a standard keyboard and receiving results in Morse code, braille, lettered responses or actual electronic speech," Olson constructed a device "which allows the blind to converse with a personal computer," the account stated.

After purchasing a Speak and Spell, he built the interface to connect it to a TRS-80. When letters are keyed on the micro's terminal, the Speak and Spell speaks them to the operator in-

stead of displaying them on the screen.

Olson received a second-place prize for this and other efforts at the award ceremony concluding the fair, but for him the project is not over.

He plans to publish an article on the project as he gets further along and to apply the payments from the article toward a personal computer of his own. Olson plans to speed up the Speak and Spell's clock to increase data entry speed and eventually purchase a voice synthesizer.

Dean Cromack's interest in computers led him to begin programming in Fortran while in high school and ultimately to build his own microcomputer from a Netronics, Inc. kit.

The Amherst, Mass. junior constructed the Elf II kit with 4K bytes of memory built around an RCA 1802 microprocessor. The CPU, alphanumeric keyboard,

(Continued on Page 109)

### Provides Development Tools

## Universal Software System Debuts

LOS ANGELES — Futuredata Computer Corp. has introduced a universal microcomputer software development system, the AMDS-FD, to provide software development tools for many popular microprocessor-based products.

The central element in the package is the Advanced Microcomputer Development System in which the MPU (either an 8-bit or 16-bit processor), up to 96K bytes of dynamic random-access memory (RAM) and a keyboard are integrated into one station.

The software operating system includes a relocatable macro assembler, object program linker,

screen-based editor, interactive debugger with disassembly and symbolic debugger and command control language.

The relocating macro assembler includes a macro library, structured conditional constructs, relocation of complex expressions and assembly time expression evaluation.

The object program linker allows the user to link up to 255 files with up to 255 relocatable segments. It also produces a memory map and reference list to aid in program debugging and documentation.

The command file allows the user to enter any valid sequence of keyboard commands as an edi-

tor compatible file, Futuredata said. This command file can then be executed as a sequence of commands to repeat a complex series of procedures.

The 8-bit processor costs \$12,900 and comes complete with 48K bytes of memory, CRT and keyboard, dual-drive floppy disk unit, RDOS software on diskette and manuals.

The 16-bit processor costs \$15,500 and comes with 96K bytes of memory, integral CRT and keyboard, dual-drive floppy disk unit, RDOS software on diskette and manuals.

Futuredata Computer Corp. is at 11205 South La Cienega Blvd., Los Angeles, Calif. 90045.



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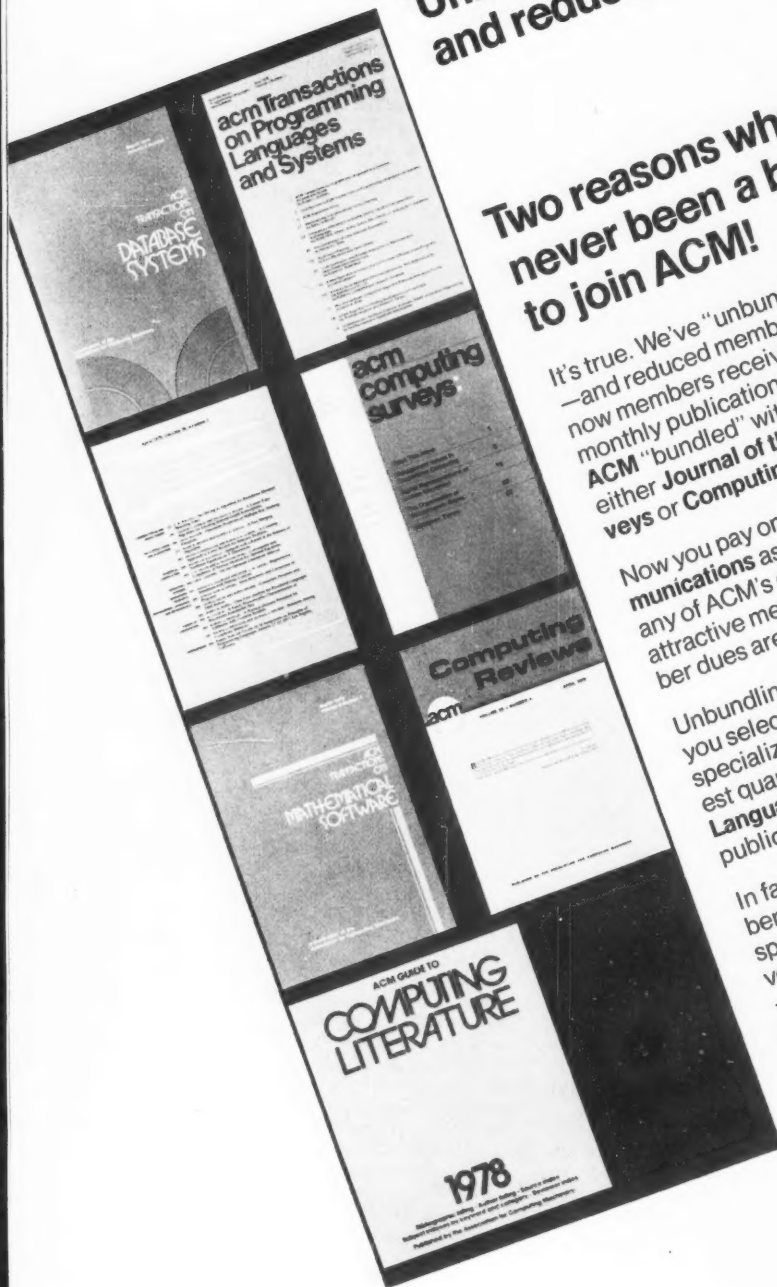
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## Micro Industry Evolving From One Faire to Another

(Continued from Page 107)

lessly.

Toggle switches were out. Data base managers were in.

And as far as the majority of software people were concerned, the only time you ever mentioned "hex" was when discussing a fantasy simulation game dealing with witches and warlocks. (Two years ago, a passing mark on a test in hexadecimal arithmetic was almost a requirement for entrance to the hall.)

Not only the product exhibits were different; the other events had a greatly changed flavor as well.

Two years ago, attendees at the Faire banquet kept the speakers going well past midnight in a question-and-answer repartee that rarely got beyond such questions as, "On pin 27 of the 6502, why is there a 2 mHz clock signal only during accumulator load operations?"

This year, the question-and-answer period again lasted well into the wee hours, but the topics were at an altogether different level. Speakers were asked, "In educational applications, will micros be able to replace teachers, or only to supplement them?" or "Will phone lines be the preferred way of tying micros to the outside world, or will we use cable TV, fiber optics or digital broadcasting?"

The emphasis had shifted from how micros work to how they will work for us.

One other apparent change had to do with how the industry related to the Faire itself.

Two years ago, the West Coast Computer Faire seemed a defacto industry convention for the microcomputer world.

This year, although the exhibit space was well filled, the industry seemed less well represented. Companies such as Apple Computer, Inc. and Commodore Business Systems, Inc., which

had fairly elaborate displays a year ago, toned down their efforts. Attendance at the Faire banquets, reduced this year from two nights to one, dropped to what seemed a mere fraction of the number of attendees two years ago.

And when Mike Markkula, chairman of Apple Computer, was named as the individual who had made the year's most significant contribution to the microcomputer industry, he couldn't be troubled to change his vacation plans to accept the award in person.

### Outgrowing the Container

It seems as if the maturing industry is finding other forums for communicating with itself. This may have to do with the fact that while the contents of the Faire have changed, the container has remained almost exactly the same.

The flavor of the Faire remained aggressively impromptu. Faire Chairman Jim Warren, for example, was sighted cruising down the exhibit aisles on roller skates. The dominant tone continued to be one of earnestness instead of professionalism. And one gets the impression the industry is finding this approach less and less relevant.

Which isn't to say that fun wasn't had by all who attended, as well as by the Faire organizers. And if the exhibitors who had to put in three long, foot-sore days didn't have fun, at least they seemed to be doing a brisk business.

In sum, the microcomputer industry over the last two years seems to have made astonishing progress along the road to having real significance in the world. But the institution of the Computer Faire itself seems headed in the other direction.

*Edlin is a marketing and advertising consultant who has handled a number of microcomputer-related accounts and was involved in promoting a personal computer show in Chicago in 1977.*

## Mass. Science Fair Draws Talented Young Scientists

(Continued from Page 107)

12-in. black-and-white television and portable cassette recorder cost him about \$350. His work earned him a third-place prize at the fair.

Cromack intends to get a degree in computer science from the University of Massachusetts at Amherst, where he already has a part-time job working with a microcomputer.

Steven Treon, a sophomore, but-tonholed this writer into looking at his display with all the insistence of a used car salesman. Treon's study of how bacteria are affected by antibiotics was done using a computer that generated reports on information he had collected in his research.

Treon tutors other students at West Roxbury High School on computer use and programming. He mentioned that his project was greatly facilitated by the use of the Bact Data system, a nationwide computer-aided system used in hospitals across the United States to monitor the effects of antibiotics on bacteria-related illnesses.

Freshman Mike Gualtieri won a

third-place prize for "Energy Auditing." He used his considerable expertise and his five years of programming experience to design a program that calculates heat loss in the home.

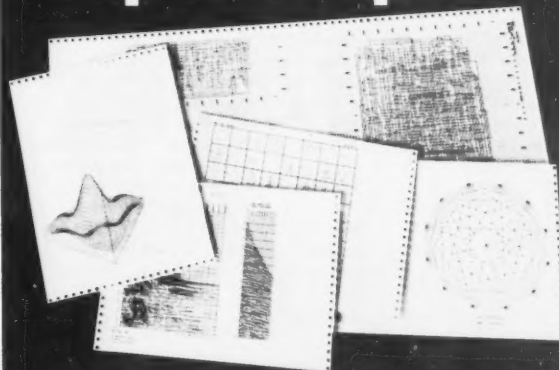
"I designed the program for simplicity, taking into account air leaks, the kind of framing around doors, whether the house has storm windows and other factors, such as how much insulation the house has."

### Everything Averaged

"Most people don't want to measure every window, so I averaged everything to make it easier to get an idea of the amount of heat being lost and what could be done to save money," he said.

Gualtieri used a Wang Laboratories, Inc. 2200PCS2 computer with two 16K-byte minidiskette drives. He had a head start over most kids his age because his father, an educational computer salesman working at Wang, used to bring home a computer for the weekend. Mike got an opportunity to try his hand at programming as a fifth grader.

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## TI Adds TM990-Compatible Modules

HOUSTON — Texas Instruments, Inc. has added two expansion modules, one of which is a combination memory and I/O expansion module, for its TM990 series microcomputer line.

The TM990/305 provides memory capacity up to 32K bytes, the firm said. Eight 24-pin memory sockets can accommodate TMS2516, 2K-by-8 erasable programmable read-only memory modules (Eeproms); TMS2532, 4K-by-8 Eeproms or 24-pin, 2K-by-8 static random-access memory modules (RAMs).

Featured are 32 optically isolated I/O lines, 16 dedicated parallel input lines and 16 user-configurable parallel I/O lines. Twenty optical

isolators are supplied with the module. Memory map configuration of the TM990/305 module is jumper-selectable. The TM990/305 is available off-the-shelf from TI dealers, preassembled, pretested, for \$495.

TI has also introduced a dynamic RAM expansion module compatible with the TM990 series. Called the TM990/203, the module is a member of TI's 16-bit TM990/9900 family and provides up to 64K bytes of dynamic RAM with parity.

### Three Models

Three models are available: TM990/203-21 with 16K bytes dynamic RAM using TMS4027, 4K-by-1 dynamic RAMs, TM990/203-22 with 32K bytes of dynamic

RAM, expandable to 64K bytes, using TMS4116 16K-by-1 dynamic RAMs; and TM990/203-23 with 64K bytes of dynamic RAMs using TMS4116 16K-by-1 dynamic RAMs.

All models have a parity option which includes a parity indicator light and interrupt signal. All feature jumper-selectable access times and cycle-steal or transparent-refresh modes. Data and address-bus interfaces are TTL compatible.

The TM990/203-21 is priced at \$820, the TM990/203-22 at \$1,325 and the TM990/203-23 at \$1,975. Further information is available from TI's Inquiry Answering Service, P.O. Box 1443 MS-6404, Houston, Texas 77001.

## Prices Reduced On Two Systems From Apple

CUPERTINO, Calif. — Apple Computer, Inc. has reduced the price of its large-memory-configured (32K and 48K) Apple II computer systems.

Previously priced at \$1,495 for the 32K system and \$1,795 for the 48K system, the units now sell for \$1,345 and \$1,495 respectively.

The price of a 16K random-access memory increment was also lowered from \$300 to \$160, reflecting new memory prices.

Apple Computer, Inc. is based at 10260 Bandy Drive, Cupertino, Calif. 95014.

## Storage System Holds 2M Bytes

HAUPPAUGE, N.Y. — The Qantex Division of North Atlantic Industries, Inc. is offering the Model 1200 tape storage system featuring 1,600 bit/in., 2-track drives and an embedded formatter.

The unit stores up to 2M bytes of unformatted data using one to three tape drives. It provides command chaining for disk search emulation and 672K-byte storage capacity per drive. When the unit is on-line, all manual controls are inhibited and control is from the host computer, the firm said.

It has a built-in Ansi/Ecma formatter providing phase encoding and decoding, automatic error checking on Write and Read using a 16-bit cyclic redundancy check character (CRCC), bi-directional Read at 30 in./sec and bi-directional search at 90 in./sec keyed to the file marks.

The Model 1200 can be used for disk backup, software development or word processing and is available with a variety of system interfaces.

The Model 1200 costs \$2,260 from Qantex, 60 Plant Ave., Hauppauge, N.Y. 11787.

## Users of H-11 Gain Operating System

W. CALDWELL, N.J. — The Dibex VM Time-Sharing Operating System has been introduced by Information Access Systems, Inc. for users of Heath Co.'s H-11, making that system comparable to certain Digital Equipment Corp. small business systems, the firm claimed.

The operating system has a Dibol language compiler that allows access to any of the existing application packages written in this language. The Dibex virtual memory techniques allow a user to run up to 30% of his jobs concurrently for increased performance, according to the firm.

Self-programming is possible with the system, and the Multiterminal Development element allows editing, compiling and linking to be used concurrently with other utilities.

Dibex is offered under a perpetual use license. The base system, which requires at least 56K bytes of memory, an I/O device and a floppy disk, carries a license fee of \$1,995.

Information Access Systems is at 1129 Bloomfield Ave., W. Caldwell, N.J. 07006.

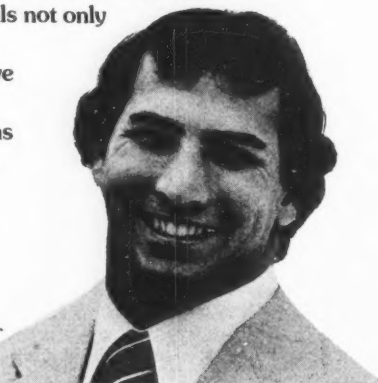
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## Intel Micros Get Support From Microbench Programs

WALNUT CREEK, Calif. — The Microbench 8048/8748 series of programs supporting applications development for the Intel Corp. 8048/8748 family of microprocessors has been introduced by Virtual Systems, Inc.

The programs operate on Digital Equipment Corp.'s LSI-11 and PDP-11 computers and include a relocating assembler, linking loader, librarian and object file formatter. The assembler supports macro and conditional assembly facilities and cross-reference listings and provides for relocatable object modules.

### ROM/RAM Alignment

The linking loader provides linkage facilities, selective loading from libraries and directives for specifying read-only memory (ROM)/Random-Access

Memory (RAM) alignment.

The object file formatter produces binaries in compatible formats for use with programmable read-only memory (Prom) programmers and emulation systems including equipment manufactured by Data I/O Corp., Prolog Corp., Tektronix, Inc. and Motorola Semiconductor Corp.

Microbench software is coded in Macro-11 and operates under all current DEC operating systems for 11-series computers.

Perpetual license fees start at \$1,695 and include documentation and first-year maintenance. Virtual Systems is at No. 406, 1500 Newell Ave., Walnut Creek, Calif. 94596.

## Computing Press Offers Series For Business

VALENCIA, Calif. — Business Computing Press is offering a series of publications aimed at businesspeople and professionals and covering the effective use of low-cost microcomputers in business.

The bimonthly journal *Business Computing Review*, provides in-depth research reporting on business computers and applications software. Reviews of major products are included as well.

"Evaluating Small Business Software" details the characteristics a quality software package must possess in order to be successful. Specific evaluation criteria are provided for common applications.

### Six Newsletters

The last of the series, the "Business Computing Newsletter," is published six times a year and presents information on the use of microcomputers in business.

Tutorials on business computing and abstracts of new products are included.

The newsletter is sent to subscribers of the *Review* and is also free at computer stores. The "Business Computing Review" is available for an actual subscription rate of \$25.

"Evaluating Small Business Software" costs \$15 from Business Computing Press, P.O. Box 55056, Valencia, Calif. 91355.

## Guide Provides Mart Overview

SAN FRANCISCO — *Personal Computers: A Comparative Guide* is being offered to users as an overview of the major products on the market today.

The special features and relative merits of each product are discussed by the author, who is a hobbyist and salesman at Computerland of San Francisco.

The publication costs \$20 from Barney Stone, 117 Fremont St., San Francisco, Calif. 94105.

## Apple II Gets Self-Indexing

SAN FRANCISCO — Computer Hardware has introduced a version of its self-indexing systems called "Wow! How'd All Than Stuff Get In There?" (Whatsit?) for the Apple Computer, Inc. Apple II microcomputer.

Like its companion models for the North Star Computers, Inc. and CP/M systems, the Model A-1 answers typed-in questions by referring to disk data that it automatically stores and revises in accordance with instructions in short "pidgin English" sentences.

A "What's Next?" request provides assisted operation, with automatic prompting.

The Soundex request enables Whatsit to recognize entries that

sound right, even when spelled incorrectly.

In addition to storing at least 2,000 entries on an Apple disk, Whatsit cross-indexes the entries automatically under any desired heading, the firm said. New headings are instantly added to the file when first mentioned and remain available for future reference, according to the firm.

Obsolete headings can be eliminated in only a few seconds, the vendor said.

Supplied on an Apple disk, Whatsit comes with a manual containing step-by-step instructions and examples. It costs \$100 from Computer Hardware at Box 14694, San Francisco, Calif. 94114.

## Announcing a complete Branch Office Computer Package for only \$8,495... from Datapoint.

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business organization. With the complete communications software provided, it tucks neatly into any network and telecommunicates freely with the home office mainframe or other Datapoint processors.

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The 1500 is so simple and easy to use, anyone can become a proficient operator in a matter of hours, even if he's never seen a computer before. There's no need for on-site data processing specialists.

With up to one million characters of capacity, you have plenty of room for local data storage. This localized processing power saves you telecommunications time and cost. And DATABUS®, the high-level business language of the 1500, is one of the most widely used programming languages in dispersed data processing.

Matched with Datapoint's matrix printer, a 160 cps speedster, you have a small system that's hard to beat for capability and cost efficiency.

### Quantity discounts

The package price for a 32K processor with communications, one-half million bytes of diskette storage, a 160 cps ma-

trix printer and system software is just \$8,495. Progressive quantity discounts take the unit cost down to only \$6,650 for more than 50 units.

Datapoint maintenance service for the package is available for \$78 per month.

### Local service

Datapoint has 665 Customer Service Representatives stationed in 138 local service offices around the country, and the number is growing. Customers call one toll-free number 24 hours a day, seven days a week, when they need service, and are usually on the phone with a Service Rep in less than an hour.

### Datapoint's approach

The new 1500 package is just one of the ways we're out-thinking our competition to help you out-think yours. We pioneered dispersed data processing and introduced the exclusive Attached Resource Computer™ system. So whether you need a hundred small systems for your remote offices, or a major computing facility for corporate headquarters, Datapoint has a solution to offer.

For more information on the Datapoint 1500 package, please send in the coupon.

\*Based on a three-year lease term.

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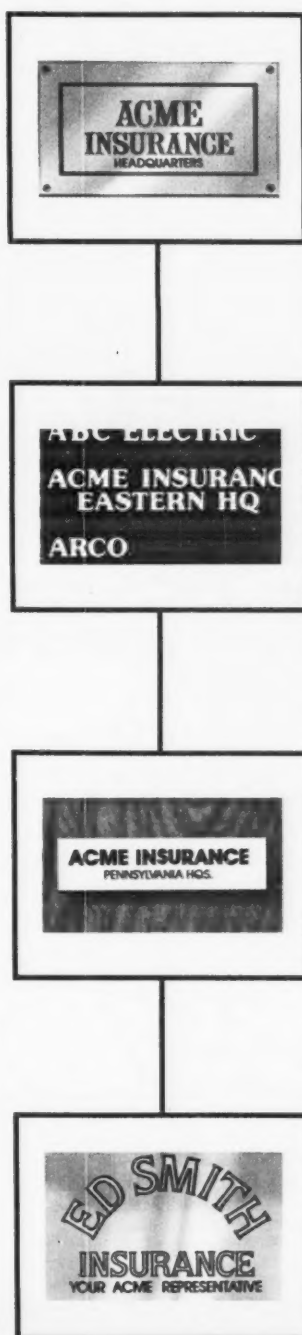


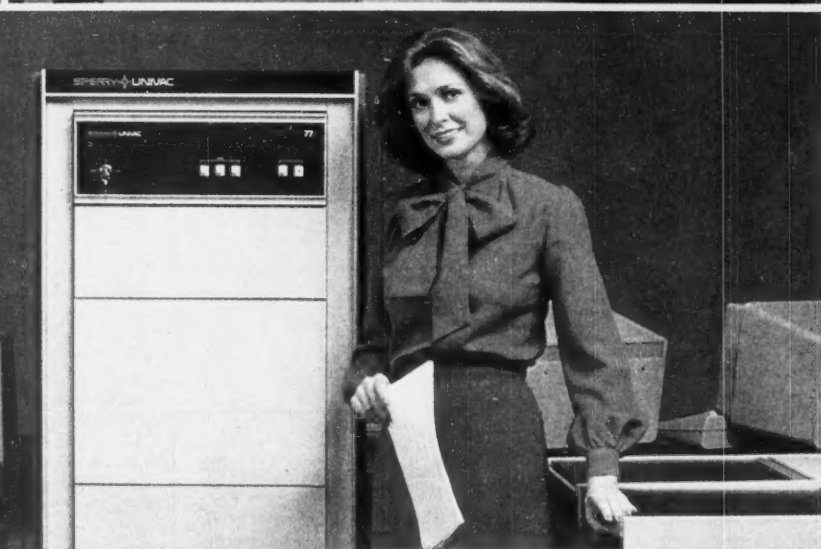
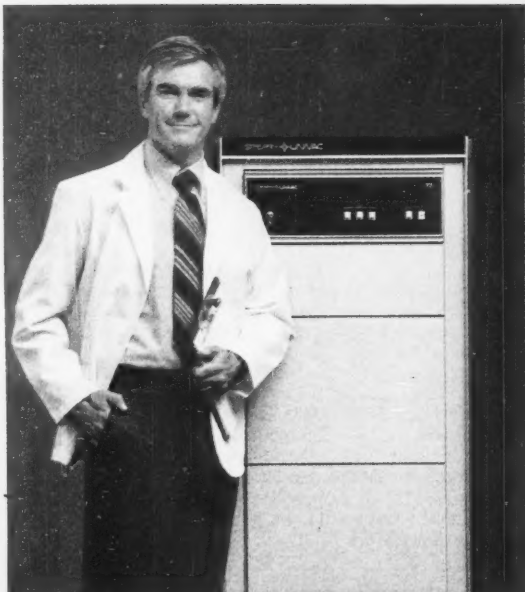
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- ☐ ARC system information
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There's an optional new high speed 64-bit floating point processor that works in conjunction with a new globally optimized ANS '77 FORTRAN.

No wonder our three most important customers think so highly of it.

### OUR OEM CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

The Miniframe is customer microprogrammable. So an OEM can implement his own firmware packages. And with the many software packages we offer, the OEM can add all the bells and whistles he wants.

The Miniframe comes with our largest instruction set ever. So OEM's with their own software have much more flexibility in design.

The Miniframe speaks PASCAL, the powerful new language for scientific, commercial, and system programming that most competitive systems still can't speak. And of course, it also speaks COBOL, FORTRAN and RPG II.

More good news is that the Miniframe is compatible with the rest of the V77 product line.

### OUR SYSTEM HOUSE CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

Naturally, system houses want all the features OEM's do. And more.

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More operating systems, for example. Choose from VORTEX or our new SUMMIT—an interactive, multi-terminal system with transaction processing and data base management. It gives you easy editing, screen formatting, and documentation aids. Plus speedy, comprehensive program development.

System houses also think PASCAL is important. Because it's more efficient, easier to maintain, expand, and modify.

The Miniframe brings systems builders a new query language called QL-77. It features inquire and report facilities. And interfaces directly to TOTAL<sup>®</sup>, the data base management system. So preprocessing and intermediate handling are a thing of the past. Finally, TOTAL also gives you complete data base access and file access security.

### OUR END USER CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

Take all the features we designed in for OEM's and systems houses and say ditto for the end user.

But we didn't stop there. We also pressed a few special hot buttons just for end users.

Consider QL-77, for example. End users will love our new query language because it reduces the

amount of application programming. By storing query language procedures right in the data base file. Where they can be easily and quickly recalled and executed at any time.

Once again, SUMMIT, our new operating system, helps the end user handle transaction processing. Without any additional, expensive software. It's also the right answer for a multi-tasking, "fully-implemented" distributed processing system.

Finally, the Miniframe supports DCA and conventional protocols. So you can talk to both SPERRY UNIVAC and IBM hosts.

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In Canada, write Headquarters, Mini-Computer Operations, 55 City Centre Drive, Mississauga, Ontario, L5B 1M4.

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## With CEs Averaging \$33,000 Vendors Wrestling With Cost of Support

By Marcy Rosenberg  
CW Staff

Sandwiched between the escalating cost of field engineering personnel and the plummeting price of hardware, computer manufacturers are struggling to find cost-effective ways to support their equipment.

Ten years ago, a vendor spent only a few thousand dollars for several on-site customer engineers (CE) to support a mainframe that carried a \$100,000 monthly rental fee. Today, one CE costs its employer \$40,000 — \$20,000 for salary, the balance covering overhead. Meanwhile, the expensive mainframe now rents for \$20,000 a month, according to Harris Liebergot, Univac's manager of systems availability.

Computer manufacturers pay a high price for service because inflation, combined with a shortfall of skilled technicians, has buoyed labor rates. Salaries have risen 6% to 8% annually for the past six to 10 years, according to Bill Klein, manager of the technical staff at Honeywell, Inc.

CEs trained in hardware and software maintenance can command annual salaries ranging from \$20,900 to \$36,000; \$33,000 is the average, industry observers estimated. Those CEs with only hardware expertise earn less — an average of \$22,600.

To bring maintenance costs more in line with hardware prices, vendors are testing a number of strategies. Among them:

- Implementing remote support assis-

tance. By linking a customer's computer to the manufacturer's remote support location via telephone lines, vendors claim they can isolate many hardware and software problems before sending a CE to the user site.

- Training customers in initial repair procedures, such as board swapping, to reduce system downtime and perhaps eliminate the need for a CE field visit.

- Stocking and distributing spare parts from central sites to cut the cost of maintaining local inventories.

- Sponsoring computer maintenance training programs in colleges and even high schools to expand the available labor pool.

- Offering incentives to attract and keep CEs.

### 'The Golden Handcuff'

While a large number of computer manufacturers dangle 15% salary boosts to lure CEs from their competitors, Pertec Computer Corp. sweetens the pot by offering to provide each CE with a new automobile.

The car, designed to tie the CE to the employer, has been dubbed "the golden handcuff" by George Harmon, vice-president and general manager of Pertec's Service Division. At least "it's one way to slow down attrition," he said.

The firm has also increased its CE staff through acquisitions. Its latest, the Philips Business Systems, Inc. small systems main-

(Continued on Page 114)

## Wang, DTS Marketing Alliance Extended to Cover VS System

By Marcia Blumenthal  
CW Staff

LOWELL, Mass. — An informal joint marketing alliance between Wang Laboratories, Inc. and Data Terminal Systems, Inc. (DTS), designed to help each company penetrate the lucrative retail industry market, has been expanded to include Wang's VS system.

The cooperative selling venture, announced last February, was originally limited to interfacing Wang's 2200 small business system with a DTS Model 515 point-of-sale (POS) terminal. The venture originated because both companies wanted a piece of the retail industry POS market, but had limited capability to compete against the industry leaders — NCR Corp. and IBM — because neither could alone provide the hardware required for a complete POS system.

Moreover, Wang did not want to buy terminals on an OEM basis because it did not have the capability to service this equipment, according to William Morris, Wang's industry marketing manager. DTS has a similar reluctance to buy processors on an OEM basis.

Now off to a good start with 15 to 20 2200-based systems sold, Wang and DTS are expanding the power range of their product offerings. One problem with the 2200 system is that it can accommodate sev-

eral terminals, but only for one store location, Morris said.

Hooking up the DTS terminals with the Wang VS allows processing from multiple store locations and enables the partners to target larger retail chains. The more powerful VS system is targeted against the IBM 3680 POS system, Morris noted.

One of the first orders for the VS-based

(Continued on Page 116)

## CW Names Two Vice-Presidents

NEWTON, Mass. — E. Drake Lundell Jr. and John R. Edmonston were elected vice-presidents of CW Communications, Inc. (CWCI), publisher of *Computerworld*, at a meeting of the company's board of directors here last week.

Lundell was named vice-president/editorial and Edmonston, vice-president/research.

Lundell joined *Computerworld* in 1969 as New York correspondent. He then covered Washington, D.C., for the newspaper before becoming editor in 1974.

Edmonston became *Computerworld's* manager of sales promotion in 1973 after fulfilling that function as an outside consultant at Doremus & Co., an advertising firm where he was the account executive for the

(Continued on Page 116)



Lundell



CW Photos by A. Dooley  
Edmonston

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**COMPUTERWORLD**  
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# Vendors Wrestling With Cost of Maintenance

(Continued from Page 113)  
tenance line, expanded Pertec's pool of CEs from 400 to more than 600.

But even barring acquisitions, the company predicts its service requirement will grow 30% over the next five years. As a result, Pertec also places some responsibility for maintenance with the user.

By supplying users with additional spare parts and training operators how and when to swap boards, "we often only need to send a CE out on a quarterly basis," Harmon remarked.

## Burroughs Goes to Colleges

Even though advances in semiconductor technology have reduced the number of parts in a computer and increased equipment reliability, user

maintenance requirements continue to escalate along with a growing installed equipment base.

For Burroughs Corp., field engineering service revenues more than doubled over a four-year period. Last year, customer services contributed \$559.2 million, or 22.7% of the firm's \$2.46 billion total revenues, compared with \$272.8 million or 17.8% of the \$1.53 billion in revenues, in 1974.

To keep pace with ever-increasing customer service demands, Burroughs has moved into academic circles to ensure a steady influx of CEs. For example, the firm recently beefed up its college graduating class recruiting campaign through which it successfully filled 15% to 20% of its CE requirement, according to George R. Johnson,

vice-president of marketing and technical support.

Burroughs culls the remaining 80% from two-year technical schools and recently implemented a pilot computer maintenance training program at a local Detroit high school (see story on Page 115).

## Centralized Spares

While labor eats up the lion's share (two-thirds) of a vendor's maintenance costs, parts and transportation expenses are nothing to sneeze at. Placing the cost of spare parts at 25% — or \$250,000 worth of spares for each \$1 million computer — "It's expensive to stock a set of spare parts at each site," Univac's Liebergot noted.

Univac reduces that cost by stocking

central locations with spares to serve a number of local areas. The trade-off is that it takes longer to get replacement parts to a local site.

What is lost in travel time, however, can be made up by the CE if he learns in advance the appropriate repair procedure and arrives at the user site with the correct part for a one-time visit.

## Remote Support

That's where remote support assistance comes in. For Honeywell, this troubleshooting technique has "virtually replaced the continuing support requirement for its 6200 and 6400 systems," Klein maintained.

And in the area of software maintenance — which does not require spare parts — remote support capabilities can often eliminate the need for any CE visit at all.

Traditional software support requires a visit by the software field engineer and a consultation with the systems analyst, followed by deliberation and corrective action, all on the customer's premises, Klein said.

Remote software support, he commented, has enabled Honeywell to down-line load patches — or avoidance routines — or entire corrective packages "without ever setting foot on the user site."

So far, Honeywell's investment in designing and implementing remote support capabilities hovers around "seven or eight figures," Klein said, noting the cost to the customer ranges from \$8 to \$15 a month for to cover communications tariff charges.

## DEC: Remote Diagnostics

Similarly, Digital Equipment Corp. spent several million dollars to set up and equip a remote support center early last year. Using this capability on its PDP-11/70 and VAX-11/780 systems, the firm has been able to respond to a customer's call within 10 minutes and boasts a 90% to 93% success rate, according to Cliff Clarke, manager of customer services administration.

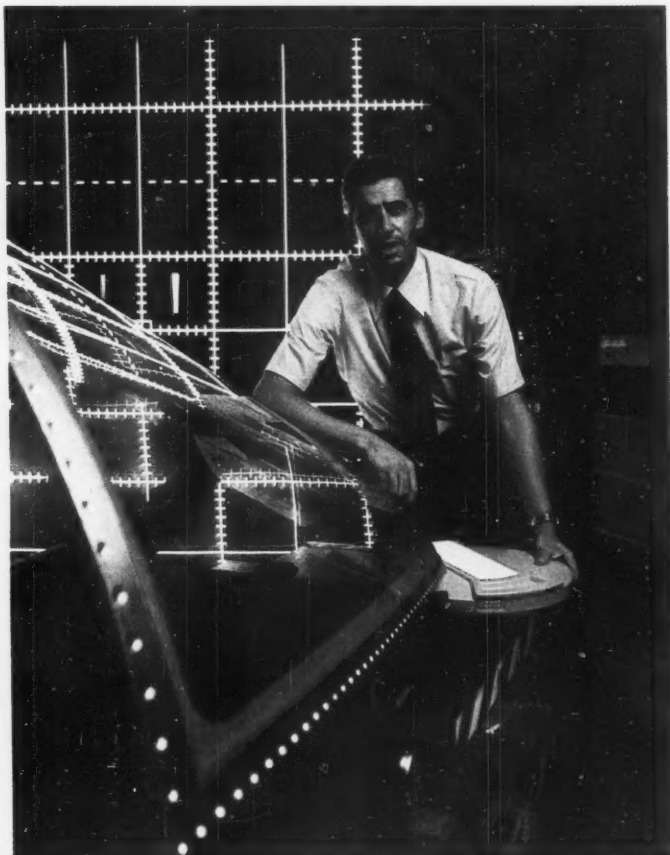
DEC plans to build remote diagnostic capabilities into new products as long as they carry high shipping volumes and require high availability. These characteristics usually apply to systems targeted to commercial applications such as industrial process control, inventory control and accounts payable and receivable, Clarke said.

Control Data Corp. has just now begun to implement remote diagnostic capability on a pilot test basis at selected sites for its Series 700 and Cyber 170 computers. "We're planning to expand its use to include the Omega 480, Cyber 18 and Cyber 1000," Bob Young, DP systems support manager, stated.

He said the four customers involved in the pilot program had initial concerns about security, but CDC designed six or seven levels of interlock into its remote support system to give customers complete control over CDC's access into their systems.

Because remote maintenance has simplified equipment repairs in many cases, CDC has reduced its need for high-level expertise in the field service organization. These individuals, Young noted, not only command higher salaries than less skilled or entry-level CEs, "but they are harder to find."

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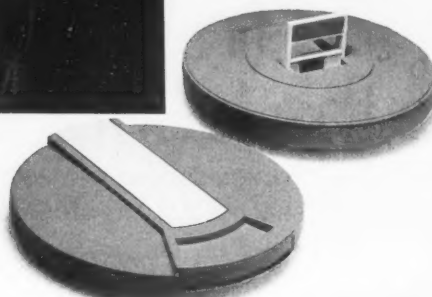
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## Burroughs Starts Them Young

By Marcy Rosenberg  
CW Staff

DETROIT — An intensifying shortage of field maintenance technicians has led Burroughs Corp. to develop a pilot high school training program to turn out customer engineers (CE).

Under an agreement with the Detroit Board of Education, the company is sponsoring a three-semester vocational training program for business machines maintenance. In the program are 24 upper juniors, including seven women, at the Martin Luther King High School here.

There is a "high probability" that Burroughs will hire students who successfully complete the course, according to George R. Johnson, the company's vice-president of marketing

and technical support. He was quick to add, however, that no student is obligated to join the firm.

Waiting for the graduates, though, may be jobs that pay \$210 per week — Burroughs' entry-level CE salary for the Detroit area.

Burroughs developed the training curriculum, provided the instructors and equipped the school with four B80 computer systems. So far, the company estimated, it has poured \$75,000 to \$100,000 into the project which, if successful, will be expanded to other cities.

"If we can get schools to adapt their curricula, it will be easier to integrate the program," Johnson maintained. Classes started in February with graduation scheduled for May 1980.

## Eagleton Blasts Accountants For Offering DP Services

WASHINGTON, D.C. — Public accounting firms that provide nonaccounting management services to their corporate audit clients raise serious questions about both their independence and fair competition.

Those remarks were made during a speech at the 50th Association of Data Processing Services Organization (Adapso) management conference here recently by Sen. Thomas J. Eagleton. The Missouri Democrat voiced strong opposition to the current practice of offering management services, including data processing, to the accounting firm clients.

Although Senate hearings were held to examine these practices more than two years ago, Eagleton, now chairman of the Senate Committee on Accounting Activities, pledged to reopen hearings, probably in August.

Previous hearings chaired by Sen. Lee Metcalf, who died last year, resulted in unanimous committee agreement that accounting firms should not be allowed to market management services to their own clients, limiting these services to nonaudit clients.

After the hearings, Metcalf's committee made this recommendation to the Securities and Exchange Commission and the Federal Trade Commission. However, neither body moved to make accounting firms comply with the Senate recommendation.

The American Institute of Certified Public Accountants (CPA) later or-

ganized an oversight committee which resulted in a statement declaring that a "substantial reduction in revenues for many CPA firms" would be the result if they stopped providing added services to their clients.

Opposing the accountants' position, Eagleton indicated to Adapso members that if the accounting profession does not clean up its own house, he will introduce legislation that will regulate the services accounting firms can offer. Jerome L. Dreyer, executive director of Adapso, reported.

As part of their accounting duties, CPA firms recommend audit systems to their clients. If an accounting firm is also in the software business, competition in the industry is severely reduced, Dreyer noted.

Moreover, "federal securities laws require every publicly owned corporation to employ the services of an accounting firm each year for an independent audit. When accountants recommend the system as well as audit it, they create a professional interest in the business activities of their clients and are placed in the position of auditing their own work," Eagleton charged.

Pointing to the bonanza accounting firms have received because of federal auditing laws, Eagleton said he wants to bring stronger economic incentives to bear on the services offered by these firms.

## Balance of '78 DP Trade Up Favorable \$428 Million

WASHINGTON, D.C. — The U.S. favorable balance of trade in computers and related equipment increased by almost half a billion dollars in 1978, according to figures released recently by the Commerce Department.

The favorable balance was \$3.439 billion, compared with \$3.011 billion the previous year. The balance of trade in electronic components, however, while still favorable, was down 54% over the 1977 level and was the lowest of the last six years.

The U.S. exported almost \$4.2 billion in computers and related equipment

during 1978, up from \$3.26 billion the year before. Imports in 1978 were \$755 million compared with \$325 million in 1977.

In electronic components, 1978 exports were 12% above the 1977 level, but imports increased by 36%. The total was a favorable \$327 million.

The trade surplus in semiconductors, which make up 64% of total component exports and 66% of imports, was \$156 million last year, up 3% over 1977, the Commerce Department said.

Within this category, the continuing trade deficit in integrated circuits rose to \$917 million, a 39% increase.



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## Supershorts

National Semiconductor Corp. and Zilog, Inc., have agreed in principle to standardize and provide alternate-source manufacturing for a family of quasi-static, 8-bit-wide random-access memories, configured 2K by 8, 4K by 8 and 8K by 8. Both firms jointly arrived at specifications that conform to the proposed Jedec 28-pin configuration.

The Computer Software Co. — a systems software firm that developed operating systems for IBM 360, 370 and 30 series equipment — has acquired the software assets of the Dearborn Software Group, which include the DOS/RS operating system and SIM-14 1400 simulation system.

Anacomp, Inc., a computer services company, will acquire the rights to United Virginia Bank's correspondent bank data processing services customers. Using its Customer Integrated Reference File (CI/RF) system, Anacomp will process customer transactions through its Winston-Salem, N.C., data center.

Control Data Corp. plans to build a 60,000 sq-ft plant in Bemidji, Minn., to manufacture electronic components for rotating disk memories. Slated for completion by the end of the year, the facility will be operated by Magnetic Peripherals, Inc., a CDC subsidiary owned jointly with Honeywell, Inc., and is expected to employ 350 persons.

## Wang, DTS Extend Pact To Cover VS System

(Continued from Page 113)

system is from a supermarket chain with 60 stores, he said.

The unique venture is still informal; both companies can modify their equipment to interface with other manufacturers' systems. However, Morris said Wang does not anticipate developing interfaces for other companies' POS gear in the near future.

Some of Wang's equipment was formerly able to be connected to some NCR equipment when Wang offered a tape cassette reader, but that product is no longer available.

A kicker in getting the VS-based system to market is the availability of demonstration systems in the regional

sales offices. One of the printed circuit boards in the VS system had to be modified and it has been difficult getting models in from the field for modification, Morris said, adding that within 30 days all of Wang's 24 regional offices will have a demonstration unit. Between 10 to 15 units are already in place.

An application package, modified from Wang's general business software, is available with the system, Morris noted. Wang's 300 software service companies can customize the basic package for a specific retailer's needs.

In selling the product, each company's sales force seeks potential customers separately. However, both consult with the customer jointly once the demonstration phase of selling begins.

Storage capacity for the systems ranges from a 280K-byte minidiskette on the PSC-II (part of the 2200 series) up to 2.3G bytes on the VS system. The number of CRT workstations available for handling direct-to-store deliveries, credit authorization and localized file management ranges from one to 32 terminals.

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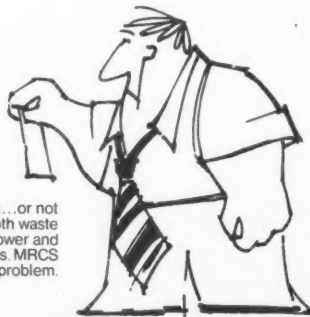
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## CW Names Two Vice-Presidents

(Continued from Page 113)

paper.

The announcement of the two promotions was made by CWCI President and Chief Operating Officer W. Walter Boyd, who said the new corporate titles recognize the important role both have been playing for some time in CWCI's worldwide activities.

"Lundell," he said, "is the best known and most qualified computer journalist in the country today. As such, he makes a very important contribution to CWCI's flagship publication, *Computerworld*."

"Edmonston, as director of sales promotion, has developed many research projects that are now accepted as standard in the field."

Lundell came to *Computerworld* from EDP News Service, Inc., where he was managing editor of *EDP Daily*, and editor of both *EDP Weekly* and *Peripherals Weekly*.

He was born in Washington, D.C., and attended Franklin and Marshall College in Lancaster, Penn., and the University of Maryland.





# Employees Swell Ranks, Slow Growth at Prime

By Marcia Blumenthal

CW Staff

BOSTON — "An Horatio Alger story using decision modeling" is the way Kenneth G. Fisher described Prime Computer, Inc. to shareholders attending the annual meeting here recently.

After presenting a glowing report of the company's 102% average annual growth rate during the past three years, Fisher, Prime's president and chief executive officer, told shareholders the company's growth would have to be slowed during the next year.

Financial analysts estimate Prime's 1979 revenue will be between \$140 million and \$160 million, and Fisher said he agreed with those estimates. Based on those projections, Prime's revenue growth for 1979 would increase between 50% and 72% from last year's levels.

## Employees Up 70%

Explaining why Prime faces the prospect of putting brakes on growth, Fisher said that the company increased the number of its employees 70% last year and will boost its total employment by about the same percentage this year. At the end of 1978, Prime employed 1,665 people.

Because about 51% of Prime's employees work in a marketing capacity, a great deal of training is needed before these employees become productive. The sheer number of employees being added to the company's professional staff along with the resources devoted to training will slow Prime's growth,

Fisher concluded.

Ironically, while adding personnel may slow Prime's growth somewhat in the immediate future, the scarcity of talented recruits is the most serious obstacle of Prime's ability to compete. "Recruiting people in a competitive environment is really where it's at for Prime," Fisher said. To hire one professional staff person requires interviews with 10 applicants, he added.

## Stock Option Plan

To position the company more favorably in the recruiting market, Prime asked shareholders to approve an increase in the number of shares of capital stock from 10 million to 25 million. Some of these additional shares will be used for a restricted stock option plan needed to attract talent to the company.

If all stock options are exercised, the net dilution effect would be 3%, Fisher estimated.

The stock option plan passed, but not without a lengthy exchange between Fisher and a disgruntled stockholder who felt Prime should start providing incentives to stockholders in the form of dividends. Fisher told shareholders that the company did not plan on paying dividends in the near term.

Fisher acknowledged that pressure from competitors was a serious challenge to sustained growth, but noted that in 1978, earnings grew 83% from 1977 levels in the face of Digital Equipment Corp.'s latest product offering.



Kenneth G. Fisher

Turning to the company's own products, Fisher explained that although historically Prime's users have been computer specialists and systems designers, during the past five years the customer base has shifted to business DP users.

Prime's niche is the low-priced multi-function system, the supermini, Fisher stressed, adding that Prime would continue to focus on that market. Volume shipments of the Prime 750 supermini will begin at the end of the second quarter, he disclosed.

Citing market trends forecast by International Data Corp., Fisher said Prime's available market would increase from a potential of \$1 billion last year to a potential of \$6 billion in 1982.

By way of illustrating the growing sophistication of computer users in general, Fisher said Prime estimated that currently only 2% of the potential users give Prime's products "a shot." By 1982, however, 14% of the users in the market will be potential Prime targets.

While Fisher would not venture to guess what Prime's share of the potential \$6 billion market would be, he claimed that Prime now holds a 10% share of its addressable market.

## Electronic Mail

While primarily targeting the supermini market, Prime also intends to enter the office of the future market. The company is now experimenting internally with an electronic mail system and sometime this year will have the service in operation throughout its offices around the world.

In addition to exploring new product areas, Prime is expanding its distribution channels. Its new dealership program for selling the Information 1000 and 5000 line, [CW, Marh 19], aimed at less sophisticated first-time users, has 16 dealers, Fisher reported.

Prime is also expanding the use of joint venture marketing agreements, particularly with software houses.

While the push is on for netting first-time users, Fisher said that 25% of Prime's business is upgrades to current users. In 1977, only 19% of the company's business was devoted to user upgrades.

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# 'Business Is Business' at Compec Europe Show

By Rex Malik

Special to CW

PARIS — Nearly 100 exhibitors displayed their wares at the Centre Rogier during Compec Europe, an exhibition of small computer systems, peripherals, software and supply services held here recently.

Compec Europe is different from most exhibitions the industry press

normally covers. Its business is business. Major companies do not save their sexiest announcements for the show.

Indeed, the majority of large companies are absent. Apart from Control Data Corp./Belgium (exhibiting its Plato system), Hewlett-Packard Co., Tektronix, Inc., Logabax and Sems, nothing remotely resembling a major

market force was present.

The show's nearest equivalent, otherwise unknown in Europe, are the regional trade shows held in the U.S. Even to call it Compec is a misnomer, for the show draws most of its exhibitors from the Benelux countries.

for 300 terminals, and the company is contracting to buy 1,000 a year, mainly for sale in Europe.

But the hit of the show, by far, was a one-year-old Italian company, Seli SPA of Milan, reconstructed by an Italian finance venture group from the remains of a large electronics company, Seimart, that went bankrupt a couple of years ago.

Seli has a license from Compunetics of Pennsylvania to manufacture a general-purpose CRT. The firm has a contract to supply them to Olivetti Corp. and is talking about sales in the thousands.

Perhaps of more long-term interest is the license Seli has obtained from the European Space Agency (ESA) for the Eurab terminal. This is a split-screen terminal that handles Latin and Arabic alphabets, which was devised by the ESA on request from the Research Institute for Arabization in Morocco. So far, that agency has bought 10 terminals.

Called the ASV-Codar, the terminal is totally Ascii-compatible, runs off a single keyboard, can handle a range of character sets from 32 to 88 and is also compatible with 5-, 6-, 7- or 8-bit codes.

## Standard Arabic Alphabet

The institute has devised a standard Arabic alphabet which is now officially being used by 21 Arab countries. Its success has gone relatively unnoticed outside of the Arab world, but by reducing the number of characters to 107, the alphabet has reduced the cost of printer fonts by about 80%.

The first task the institute is assigning the terminals is to input, on-line, to the ESA about 600,000 definitions currently stored in the institute's archives. This will take five years and is expected to cost nearly \$2 million.

But the result will be a dictionary, easily interpretable throughout the Arab world. It will contain Arabic, English and French equivalents together with source and notation data.

## International News

Small companies dominate the show; most of them are agents selling a wide range of products. Noron SA of Belgium, for example, sells ISC, Grinnell and Intertec Data Systems Corp. products, while MCR Electronics Marketing peddles Digital Microsystems, Polymorphic Systems, Inc., Futuredata Computer Corp., Soroc, Halcyon, Inc. and Nokia gear.

### What Is Nokia?

Nokia? It's a major Finnish firm better known outside of Finland for pulp and paper manufacture. In Finland, however, Nokia is CII-Honeywell-Bull's agent and a manufacturer of its own small business system, the Nokia series.

Based on a bipolar, 16-bit microprocessor of its own design, the system looks much like the 8080. This system, the Mikko 3, comes in four versions which range in power from 64K bytes of 128K bytes, with a 256K-byte version ready for release shortly. The largest model supports 12 workstations.

Last year, Nokia reportedly sold 1,200 of these systems in Finland alone, largely in the data entry field. Said to emulate equipment from both CII-Honeywell-Bull and IBM, Nokia is entering the European market through sales to Holland.

The company recently signed a contract to deliver CDC a small CRT terminal that can be individually tilted and turned. CDC's initial order was

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## Contracts

Storage Technology Corp. has signed a long-term contract with Honeywell, Inc. to supply certain tape data storage devices to Honeywell. The potential value of the contract is in excess of \$50 million.

Cutler-Hammer, Inc. has been awarded a \$21 million contract by the Federal Aviation Administration for 116 radar digitizers for its computer-based, automated air traffic control system.

Delta Data Systems Corp. has been awarded a contract to supply Delta 7000 systems to a U.S. government agency over a five-year period.

International Computing Co. has been awarded a contract from the National Association of Security Dealers to install communications concentrators in its security quotation network. The value of the contract is more than \$800,000.

Lockheed Electronics Co., Inc. has been awarded a contract by the Federal Aviation Administration to develop two engineering models of a computerized terminal information processing system to demonstrate the potential use of such systems in air traffic control at the nation's busiest airports. The contract is valued at more than \$880,000.

ITT Cannon Electric has been awarded contracts jointly from Honeywell, Inc. and Magnavox Government and Industrial Electronics Co. Worth more than \$2 million, the contracts are for electrical connectors for a government communications program.

Hughes Aircraft Co. has been selected by the Federal Republic of Germany to handle the design and installation of a computerized air defense system in southern Germany. The program is valued at more than \$150 million.

General Electric Co. has signed a contract with the Federal Reserve Bank of New York for terminal devices to be used on an electronic funds and securities transfer system.

## Europe Getting Nervous Japan: Storming DP Mart or Not?

By Bohdan O. Szuprowicz  
Special to CW

LONDON — The Japanese computer industry's global strategy under the leadership of its formidable Ministry of International Trade and Industry (MITI) was one important topic of discussion during the "Politics and Computing" sessions of the European Computing Review conference that was held here recently.

The European computer industries, including hardware, software and service sectors, are becoming increasingly apprehensive about the Japanese threat to their rapidly growing DP markets. In some quarters, however, questions are being raised about

whether this Japanese threat may be overstated and premature. It was pointed out that persistent warnings about the Japanese hardware invasion of the European markets have not been well substantiated so far.

On the other hand, European countries are already inundated with Japanese consumer goods, including electronics and office equipment products; most resorted long ago to restrictive import quotas. This is unlike the wide-open import markets of the U.S., where quotas on imports of Japanese TV sets and some electronic products are a relatively new development.

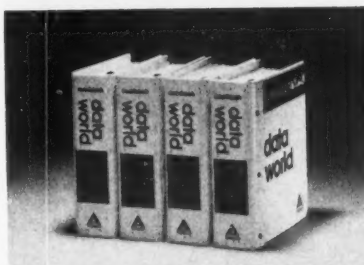
The thrust of any Japanese DP hardware export drive is expected to reach

the American markets first and, indeed, some Japanese industry specialists openly admit that it is so.

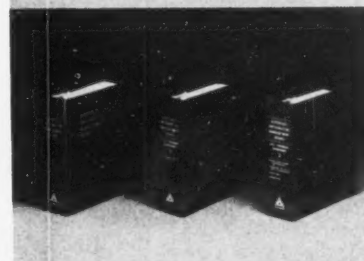
### Japan: Growing Exporter

As a matter of fact, in exports of office equipment and computers, Japan is already the third largest trading country in the world — after the U.S. and West Germany. Interestingly, whereas Japanese exports in this category have more than doubled from about \$730 million in 1974 to an estimated \$1.65 billion in 1978, imports of such products into Japan have shown only a modest increase from \$492 million in 1974 to an estimated \$600 million

(Continued on Page 120)



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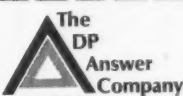
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# Japan's Computer Industry: Growing or Not?

(Continued from Page 119)

In fact, these were actually down from the 1977 high of \$619 million. If inflation in prices of manufactured goods is taken into account, it is questionable whether Japan increased the quantity of those imports at all.

What is unquestionable is the fact that Japan consistently earned an increasing surplus in this trade category, which in 1978 exceeded \$1 billion for the first time. This makes Japan the second largest net exporter in this trade after the U.S.

Since its exports are growing

considerably faster, Japan should become the leading net exporter of office equipment and computer equipment in the world in a few more years.

However, whereas 85% of this trade category is represented by computers, peripherals and parts, this is not yet true of Japan. Only about 20% of such exports — valued at about \$250 million in 1978 — could be classified as computers and peripheral equipment.

Nevertheless, the U.S. Department of Commerce's projections indicate that by 1982 Japan should be exporting considerably more than \$700 million of computers and peripherals. If this growth continues, Japan is very likely to become a \$1 billion exporter of DP equipment alone by the mid-1980s.

## Stress on Domestic Arena

Japanese penetration of foreign DP markets has been sluggish so far, giving rise to doubts about its ability (or even desire) to expand into foreign computer markets. The main reason for this apparently poor performance is Japan's obsession with protection of its rapidly growing domestic computer industry and a very concentrated effort to capture a big enough market share in Japan to keep IBM penetration to a minimum.

Japanese suppliers now claim to control 64% of all domestic installations and 57% of the value of installed DP equipment.

Although IBM continues to be the leading supplier in Japan, its market share has been shaved down through the years to 29% of the value of all DP installations in Japan in 1977. Fujitsu Ltd. and Hitachi Ltd. each already boast 33.2% and 15.8% of all Japanese installations compared with IBM's 14.4%.

This means IBM continued to dominate the market, particularly in large computer systems, and it also explains why Japanese manufacturers are so eager to develop large computer systems to compete head-on with IBM.

At stake is a \$10 billion — or bigger — hardware market for large machines in Japan between now and 1986, which alone exceeds the total expected sales of medium, small and minicomputers during the same period.

## Prime Target: U.S.

Nevertheless, saturation of the Japanese domestic DP markets and highly efficient hardware manufacturing facilities are now making it necessary for Japanese hardware makers to expand in foreign markets. The U.S., rather than Europe, is the prime target because the market is large and

less restrictive, but problems are still arising from the large Japanese trade surplus with the U.S.

As a result, OEM deals and joint ventures with American manufacturers are the order of the day. These are low-profile approaches to the American market and, indeed, have also been chosen by the Japanese in such countries as Australia, Brazil, Korea, Spain and even Saudi Arabia.

Although Japanese comput-

ers are now in operation in almost 20 countries including such places as Bulgaria and Uganda, the main thrust of the Japanese computer export drive will probably remain in OEM products and the foreign assembly of Japanese equipment by manufacturing subsidiaries. The appreciating value of the yen makes acquisition of foreign plants and production equipment a very attractive business proposition.



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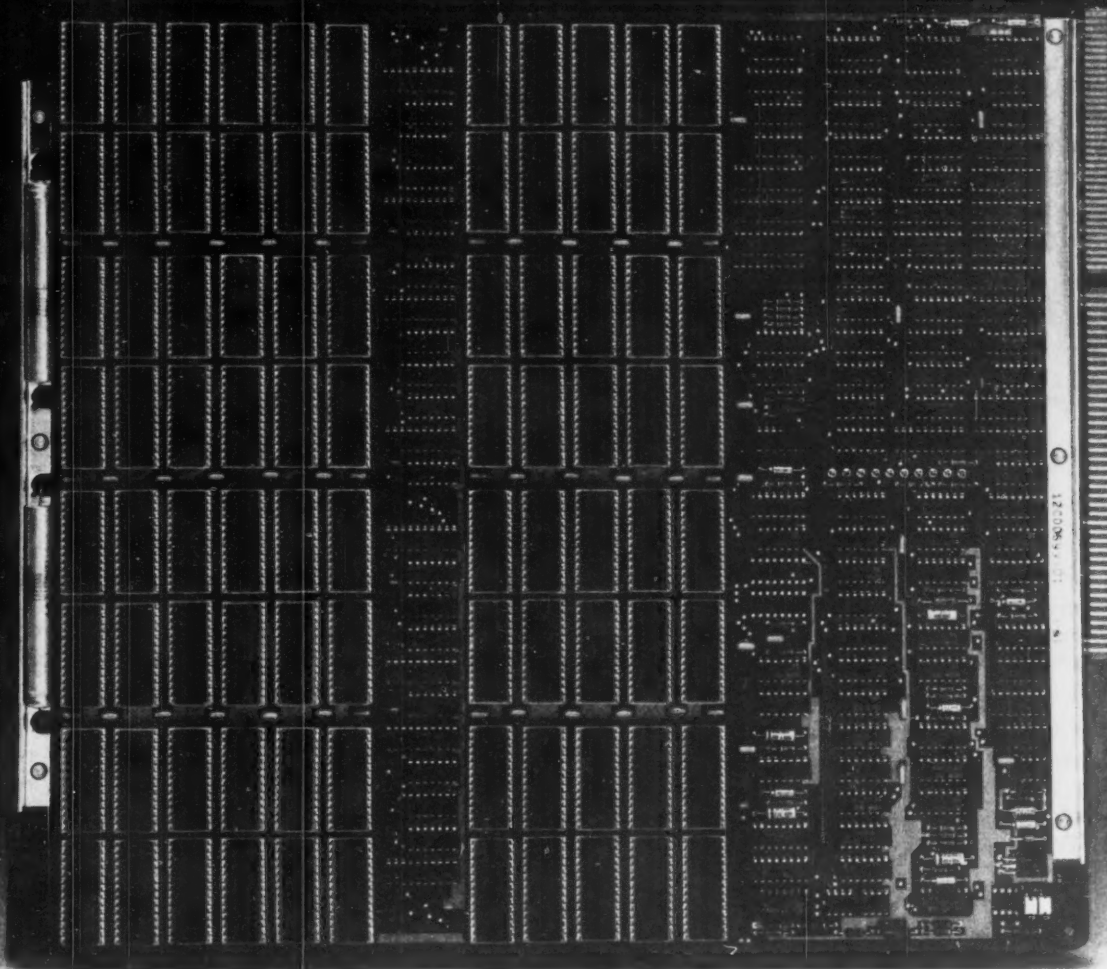
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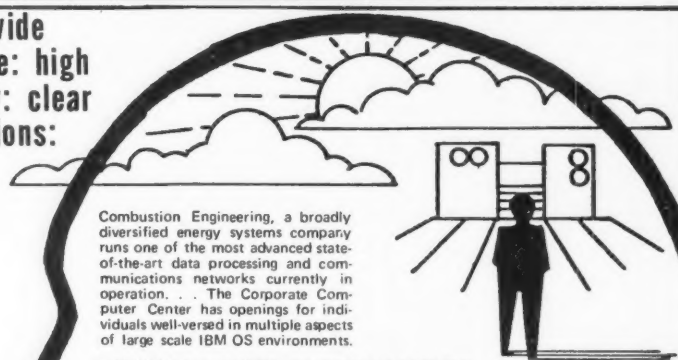
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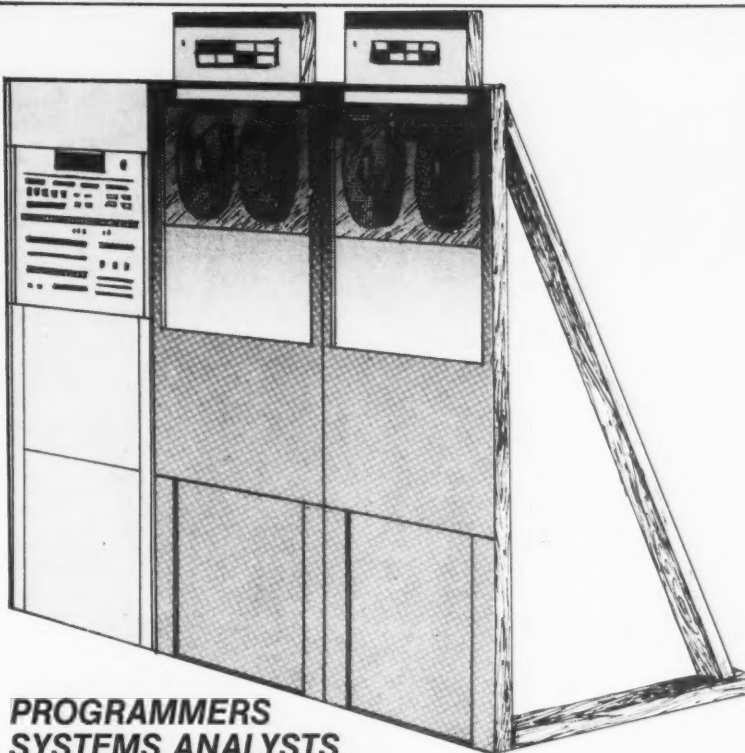
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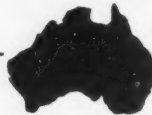
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**THE MYER EMPORIUM LTD.** Australia's largest Department Store Group and one of the World's largest retailing organisations have commenced what is the most exciting and significant Data Processing project in Australia today. It is envisaged that a new **NATIONAL COMMUNICATIONS NETWORK**, incorporating the Point of Sale, will be developed needing the latest "State of the Art" technology. A study has been initiated to establish the requirements of the new System, the **STRATEGIC DESIGN** and the **STRATEGIC PLAN**.

Several key people are needed NOW to participate in the study and then take part in the design, development and implementation. Location will be at the Corporate Head Office of Myer in Melbourne. Currently Myer operate a mix of IBM mainframes and NCR/POS terminals across Australia.

### COMPANY INFORMATION:

The Myer Emporium was established in 1905 and currently employs 29,000 people in 122 stores and locations. The company is comprised of four profit centres:

- Myer Department Stores
- Target Australia mass merchandising division
- Target Supermarkets food chain
- Myer Shopping Centres Property development division

Their revenue for 1978 was \$US1.31 billion with planned annual revenue increases hence the need to greatly increase their Information Processing capabilities.

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### Positions Available

#### SYSTEMS DEVELOPMENT MANAGER

Reporting directly to the Manager of Corporate Information Services. The successful person will plan, lead and control a large team (around 80) D.P. professionals. It is expected the person will have a minimum of 12 years D.P. experience and currently be in a senior position.

Because of the scope of the project a complete understanding of Systems Development Methodology will be needed together with current knowledge of Data Communications and Data Base design. A successful Management record is a pre-requisite, considering the importance of the Development to the MYER Group of companies. Retail and translocation experience would make the person ideal.

Remuneration will be by way of a package comprising salary, company car, executive benefits and it is thought that \$US60,000 should be taken as a guide. All relocation costs will be paid to Melbourne.

### TECHNICAL SERVICES MANAGER

This position also reports directly to the Manager of Corporate Information Services. This is a unique opportunity for a person with experience and a sound working knowledge of Network Engineering, Hardware and Systems Software Support and Maintenance, Research and Development, to obtain the type of career position that many only dream about.

The successful appointee must take full responsibility for designing and implementing a Nationwide mixed supplier Data Communications Network, plus Design/Evaluation/Selection of Systems Software.

An exciting function of this position will be the Research and Development of new Hardware and Software announcements in order to appreciate the impact of the Strategic Design. Apart from a high technical capability a strong management track record is essential. Knowledge of MVS and IMS will be imperative.

Remuneration will be by way of a generous salary plus a company car and executive benefits, but \$US45,000 should be taken as a guide. Relocation costs will be paid to Melbourne.

### DATA BASE SPECIALIST

The Myer Information Services Group also need people who have designed, developed and implemented substantial IMS Data-Bases. These people will take primary roles in Designing, Developing and Implementing the Myer Data-Base. The opportunity offered here is unparalleled in Australia.

Remuneration will be by way of a generous salary plus executive benefits, however \$US33,000 should be taken as a guide.

### PROJECT TEAMS

As the strategic plan is developed a large number of D.P. professionals will be offered, technically and financially rewarding career positions as Analysts, Programmers, Network Engineers, On-Line Specialists etc. If you have in excess of five years recent practical experience with Retail and Commercial applications, On-line/D.B. commercial applications, IMS-MVS-OS/VS II Systems Software then you should apply now.

### ACTION

Battles and Associates of Sydney, Recruitment Consultants since 1971, have been appointed International Search Consultants for the Myer Emporium.

The Joint Managing Director of Battles and Associates, Kevin D. Howard, will be in the United States and Canada, during the month of June. He will be attending the N.C.C. staying at the Americana Hotel (Telephone 212 581 1000) and welcomes calls from those people who are genuinely interested and have the experience and a true desire to emigrate to Australia.

All written replies should be directed as quickly as possible to our respected Associate Company in the U.S., the Bryant Bureau, who will then co-ordinate interview times. Address all mail to:

Kevin D. Howard

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BSEE preferred in one or more of the following areas: Electrical Engineering, Physics or Computer Science (experience in lieu of degree would be considered). At least 3 years real-time Assembly language programming background desired. Responsible for software design, coding, testing and integration of the software program into the hardware systems. Experience should include one or more of the following areas:

- E/W Computer Systems • Multi-computer System Architecture
- Firmware Coding

We are also seeking individuals with experience in airborne minicomputers, EW computer systems, multi-computer architecture applications for jammers, radar warning receivers, threat analysis and EW techniques, emitter studies, radar microwave computer signal processing, receiver definitions, and the total integration of systems. These positions would involve technical studies, customer interface and application of the latest state-of-the-art in EW airborne equipments and related countermeasures to meet the requirements in a total system.

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(212) 752-6000, Ext. 8689

If not convenient to call, send your resume to Mr. Niederer, ITT Avionics Division, 390 Washington Avenue, Nutley, New Jersey 07110.

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#### Software Engineers

Experienced in program real-time environment working with Intel 8080 microprocessors. Diagnostics routines and I/O exposure. Basic Assembly Language req'd.

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Prepare, perform functional integration tests for telephone systems. Interface with software & hardware engineering depts. to resolve problems during tests.

#### Hardware Engineers

Design telephone switching trunk systems.

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Background in business and engineering management is desirable with knowledge of switching systems principles and interface requirements for International Class 4 and 5 exchanges.

#### Telephony Power

Telephony experience preferred in systems power dimensioning and specific knowledge including rectifiers, discharge bases, batteries (lead acid and Ni-Cad), ring and tone systems.

#### Systems Analyst—Financial

Responsible for design and implementation of MIS programs.

For interview with ITT North, call

**Tom Marsh**  
(212) 752-6000, Ext. 7755

If not convenient to call, send your resume to Mr. Marsh, ITT North, 7321 N. Atlantic Avenue, Cape Canaveral, Florida 32920.

### ITT COURIER

#### Tempe, Arizona

ITT Courier is a rapidly growing producer of microcomputer-based data terminal products, and the largest non-IBM producer of 3270-type devices. We are located in the metropolitan Phoenix area, capital of the Southwest Sunbelt. We have a challenging professional climate, where the creative individual can make a difference, in a company that's large enough to have resources to do the job right and yet small enough to be responsive to the individual professional.

#### Senior Technical Positions for

#### Systems Engineers

#### Software Professionals

Ground-floor opportunities exist for individuals with expertise in software development, especially in real-time communications-based systems. Operating system & micro-processor exp. a plus.

Also openings in a growing Business Systems Group for

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Experience in defining, evaluating, designing and implementing complex computer-based information systems. 3-5 years experience required with an undergraduate degree in Computer Science or Business Administration desirable. The following specific experience will be a plus: work with large-scale IBM computer systems, data base experience with on-line systems and a background in a manufacturing environment. Positions require consulting exp., systems analysis and cost analysis skills, and technical knowledge of computer systems.

#### Systems Software Programmers

Install and maintain a CICS Software System, to provide support applications for a national telecommunications network. 1-3 years CICS exp. required with background in ACF/NCP, ACF/VTAM and VSAM desired.

#### Programmer/Analysts

Requires programming background in a manufacturing and/or finance environment. 3-5 years exp. required with a knowledge of COBOL, OS/VS1 and CICS desired.

For interview with ITT Courier, call

**Robert Marsh**  
(212) 752-6000, Ext. 7748

If not convenient to call, send your resume to E. M. Beltran, ITT Courier, MSA12-1, 1515 W. 14 Street, Tempe, Arizona 85281.

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- Software Design Methodology
- Call Processing
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- Data Base Management
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- Operating Systems
- Microprocessors Emulation
- Test Systems
- Diagnostics
- Administration
- File Maintenance Systems

All positions require an MS Computer Science, MSEE, or a BS Computer Science/BSEE and at least 5 years software design experience in one or more of the above listed areas. Telecommunications switching experience is a definite plus but is not mandatory.

#### U.S. CITIZENSHIP NOT REQUIRED.

For interview with ITT/TTC, call

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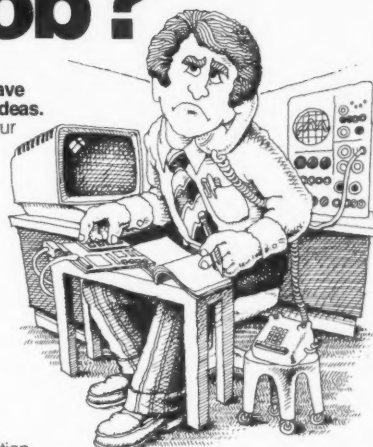
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You will be responsible for managing a highly competent group of professionals and leading the development of state-of-the-art software systems, including compilers, assemblers, and operating systems. You must have demonstrated substantial technical and managerial ability with at least 2-4 years of software management experience and an MS/Computer Science or related field or equivalent combination of education and experience.

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## Software Design Engineers

You will be responsible for the design, development and testing of general purpose microprocessor based software. You should have an MS/Computer Science or related field, or equivalent, with solid experience in mini or microprocessor systems software. Familiarity with human factors engineering, high level implementation languages, LL/LR compiling techniques, or modern operating systems design theory would be a valuable asset.

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You will be responsible for staffing and managing a new team to support corporate-wide, multi-site/use of interactive computer graphics systems. Your team will determine needs and develop programs and procedures for VLSI design applications and system management; as well as prepare training programs and coordinate common usage at multiple sites. This position requires a BSEE or equivalent combination of education and experience as well as at least 3 years' experience in programming interactive graphic systems plus a demonstrated expertise in FORTRAN and structured programming methodology. Experience with RSX-11M is desirable but not required.

If you're attending the National Computer Conference, stop by and see our employment representatives to discuss a career at Intel. But if you're unavailable at NCC, please send your resume to Joyce Cordi, Intel Corporation, Dept. 23AC, P.O. Box 3078, Santa Clara, CA 95051. An equal opportunity employer m/f/h.

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We have work in DBMS internals, access methods, locking protocol, recovery, deadlock detection, transaction processing. We need utility designers to work on our data dictionary and directory facilities. And we want language people to help build exciting new Query and Report writers for our data base.

If you've had 2-6 years of solid experience in systems programming and design and you'd like to help us build a new integrated data base product, send your resume with salary history to Elaine F. Rosenberg, Professional Recruiting, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851.

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To qualify, you should have a degree with experience in programming and analysis. The ideal individual will have a minimum of 2-3 years experience and strong analytical capabilities. You'll review & analyze present methods while proposing and developing improved systems & procedures. We'll supply training in techniques of information processing, systems analysis, forms design and problem analysis so that you in turn will be able to direct programmers and trainees.

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A B.S. in Computer Science or a B.A. with a proven ability in programming is required. Under the direction of a Project Team Leader, you'll develop computer programs by translating program specifications and designing block diagrams into COBOL source language code.

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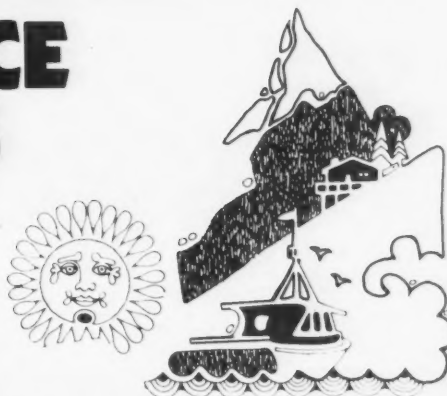
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Requires experience at assembly language level with knowledge in any one of the following systems software areas: Operating Systems; Communications; Teleprocessing; Interactive Systems and Associated Languages; Utilities and Space Management; Security and Privacy Systems; Real-Time Transaction Driven Systems; and Systems Programmers to perform technical documentation. Also requires experience on large scale IBM Systems or GA 16-460 computers.

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These are primarily ANSI X3.9 Fortran systems. Structured programming experience is highly desirable. Candidates should be available for some travel.

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We currently have immediate openings throughout the country. To find out more about these positions, contact the regional recruiters listed below (either call collect or send your resume including salary history).

- New England: Joan Vasilopoulos (617) 235-8171, 888 Worcester Rd., Wellesley, MA 02181.  
Cambridge and Wellesley, MA; New Haven and Norwalk, CT.
- Mid Atlantic: Jim O'Sullivan (212) 557-1122, 144 East 44th St., New York, NY 10017.  
New York City, Melville, L.I., Westchester, Rochester and Syracuse, NY.
- Federal: DC/MD/VA: Maury Shyne (703) 827-9600, 1757 Old Meadow Rd., McLean, VA 22101.  
Washington, D.C.
- Midwest: Joe Elias (312) 364-3000, 703 West Algonquin Rd., Arlington Heights, IL 60005.  
Columbus and Cleveland, OH; Milwaukee, WI; Chicago and Peoria, IL; and Kansas City, KS
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Data General

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Any combination of training and experience equivalent to a degree in Business Administration, Mathematics, Computer Sciences or related fields plus two years experience with COBOL and/or FORTRAN on large timesharing systems. A background in CDC CYBER hardware with NOS/BE is preferred, but not necessary.

Must be a U.S. citizen.  
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The applicant should have at least five years of data processing experience with small or medium scale systems (DEC 11/54, 11/70) and should have at least two years of high level management experience in all aspects of college records systems. It is essential that the applicant have excellent oral and written communications skills. Exposure to community college environment is desirable. The applicant should be familiar with BASIC, COBOL, FORTRAN, RPG II, and the RSTS/E operating system. Applicants with a master's degree in a computer related discipline, or equivalent experience are preferred. Salary is competitive with excellent benefits.

Deadline for applications: June 18, 1979. Direct inquiries to:

Mr. Roger C. McGee  
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Atlanta, Georgia 30303  
(404) 581-0040

## position announcements

## position announcements

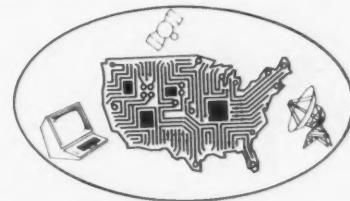
## position announcements

## position announcements

# Digital Data Communications Software

## Opportunities in Southern California

Xerox Telecommunications Network (XTEN) is located in the beautiful, sunny, hillside area of the San Fernando Valley.



Design-level technical and management opportunities are currently available with XTEN... the new Xerox-designed nationwide digital communications system. Here are some of the special advantages we can offer you:

- At XTEN, our top management people are also top digital communications and software engineers who appreciate and provide incentives for talented people.
- You will work on one of the newest and largest digital data communications systems projects.
- Our software engineering teams are revolutionizing digital communications through the development of advanced network design, distributed and federated processing architectures, and real-time digital data communications software design and development.
- Ground floor opportunities for creative data communications software development with one of the finest communications design teams.
- At XTEN, software specialists are respected professionals with ample opportunity for career growth and challenging assignments.

Currently, we are seeking software engineers in the following disciplines:

**SOFTWARE DESIGN & DEVELOPMENT**

**Applications Software.** Large-scale network command and control system development. Logistics, maintenance and fault recovery software, network accounting administrative software involving real-time data base administration, switch and network management software, as well as operating system/executive software.

**Support Software.** Involved in compiler, assembler simulator development and system modeling as well as system utilities and software/firmware development tools. Support effort is related to network control computers, node storage, switching, and processing minicomputers, and subscriber unit microprocessors.

**Data Base Software.** Responsible for logical and physical data base design and implementation related to communications systems, i.e., large scale data base design/management for both network control management and end-users.

**FIRMWARE DESIGN & DIAGNOSTICS**

Specify, design, and test digital logic firmware and diagnostic software. Develop software/firmware to detect and correct hardware and software faults. Develop programs for common control diagnostics and recovery and diagnostic programs for peripheral equipment and maintenance support programs.

**SUBSYSTEM & NETWORK SYSTEM TESTING & CONFIGURATION MANAGEMENT**

Development and execution of comprehensive test plans to evaluate the performance of network and node switching systems. Execute configuration management on all firmware, software, and documentation and maintain project control for all activities. System evaluation and test performed on both prototypes and initial field site locations. Software verification and validation.

Other positions available in **network processing and other engineering areas.**

All positions require 8-10 years hands-on experience with emphasis upon progressive technical accomplishments in data communications software.

Middle management positions also require 3-5 years experience at the group and/or section head level.

♦ ♦ ♦ ♦

Xerox offers an excellent salary/benefits package (including hospitalization, major medical, dental, disability and life insurance), profit sharing, credit union and generous relocation assistance.

If you're a software engineering professional with appropriate academic, technical credentials, consider a career with XTEN.

**SEE US IN NEW YORK DURING NCC**

Call between 10 AM and 7 PM on Monday through Wednesday (June 4-6) to arrange an appointment

Mike Hanson at (212) 755-4000

If an interview in New York is not convenient, call collect to Tom Soderquist, Manager of Employment, at (213) 705-6335. Or send resume to Mr. Soderquist, XTEN Services, 18321 Ventura Blvd., Suite 300, Tarzana, California 91356.

We are an affirmative action employer (male/female)

# XEROX



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## the answer is clear.



Clear Lake, that is. If you'd rather be sailing, fishing, boating, or skiing, then you should be working for Ford Aerospace and Communications Corporation. We're located in the Clear Lake area, situated by Galveston Bay, just 25 miles from the Gulf of Mexico, known for excellent deep sea fishing. Around the lake there are numerous marinas and yacht basins that distinguish the area as the boating mecca of the Gulf Coast. And we're a comfortable distance from the big city—just 30 minutes from downtown Houston. Our career opportunities are equally attractive. As a leader in custom data processing systems for large-scale ground-based communications, command and control applications, we have immediate openings for experienced digital design, analog design, and minicomputer systems engineers for long-term assignments in our Space Shuttle and Earth Resources support programs. We can offer highly competitive salaries and an outstanding benefits package, as well as excellent opportunities for advancement. What's more, Texas doesn't have a state income tax. So if you're looking for a career opportunity that won't interfere with your fishing, or if you want to get away from the big city for more than just a weekend, the answer is clear. Ford Aerospace & Communications Corporation. For more information CALL COLLECT or send a resume to Mr. John Brown, Space Information Systems Operation, P.O. Box 58487, Houston, Texas, 77058, (713) 488-1270.



### Ford Aerospace & Communications Corporation

We are an equal opportunity employer, m/f.

## Senior IMS Systems Programmer To \$30K — San Francisco

Our Bay Area Client has an immediate opening for an IMS Systems Programmer. This position requires six years in Data Processing with a minimum of three+ years in IMS/MVS internals. Responsibilities include maintenance, generation and troubleshooting of an IMS/VS DB/DC system in an MVS/SNA environment. Other duties include performance monitoring, tuning, data base recovery procedures, maintenance of on-line test environment, MTO training and applications/operations support. This position requires excellent oral and written communication skills, high level knowledge of IMS/VS Utilities/Internals, ALC MVS/SNA from a Debug/Performance Tuning standpoint. Relocation expenses will be paid and an excellent benefits package is offered.

We are consultants to management. For immediate consideration, please send resume and salary history in confidence to: **Gary R. Schultz, One Maritime Plaza, Suite 1350, San Francisco, California 94111. (415) 956-7120.** Employer assumes fee.

professionals for computing, inc.

frank leonard  
PERSONNEL

### FLORIDA SYSTEM SOFTWARE DEVELOPMENT

Leading data processing communication and peripheral manufacturer located in the sunshine state is looking for talented professionals who are interested in design and development (not maintenance) of operating systems software. Experience in the areas of operating systems design or compiler design using ASSEMBLER language on large scale IBM 370 operating systems is desirable. Please submit resume including salary history or call:

FRANK LEONARD PERSONNEL  
1211 North Westshore Boulevard  
Tampa, Florida 33607  
813-872-1853

## APPLIED DATA RESEARCH Princeton, New Jersey

### SOFTWARE DEVELOPERS

ADR is the #1 software products company in the world. We are large enough to be stable and respected, small enough to be informal—with room for personal recognition and professional advancement. Our attractive Princeton, N.J. location offers a quiet rural environment within easy reach of both New York City and Philadelphia.

We are currently embarking on several new projects. The result is an immediate need for a variety of talented and highly motivated data processing professionals.

**All positions require two or more years of Assembly language programming experience and a B.S. or M.S. degree in Computer Science or a related field. Relevant experience may be accepted in lieu of a degree.**

#### • Online Program Development Systems

**Telecommunications Specialist**—Design and implement TP subsystems to support local and remote 3270-type and TTY-compatible devices. Requires expert knowledge of START/STOP and bisync line protocols.

**Compiler/Interpreter Writer**—Participate in development of a new online procedure language. Special emphasis will be placed on a "user friendly" design. Knowledge of compiler writing and error recovery and repair techniques required.

**Software Programmer**—Participate in development of online product under CICS and DATACOM/DC in OS/VS and DOS/VS environments. Familiarity with CICS or DATACOM/DC and knowledge of OS/VS1 or DOS/VS1 internals highly desirable.

**Software Programmer**—Participate in development of online debugging aids. Knowledge of COBOL essential.

#### • DOS/VS/VSE Performance Measurement

Assist in the design and implementation of performance measurement tools for DOS/VS. Requires knowledge of DOS/VS internals. Familiarity with performance measurement preferred.

#### • Online Program Generation Systems

Assist in the design and implementation of an online program development/generation system. Requires familiarity with commercial applications, data base concepts and language processors (compilers, interpreters, or query languages). Programming experience with display terminals preferred.

#### • Data Management Systems

Lead a team of analysts in the design and implementation of a data management system for online and batch access. The problems you will be addressing include: data security, multi-CPU access, distributed processing and data encryption. Requires knowledge of MVS internals. Knowledge of data base concepts preferred.

#### • Source Program Management Systems

Participate in design and implementation of new features and enhancements for one of the industry's best-known software products. Heavy DOS/VS system experience essential.

Call ADR at 609/921-8550 or send your resume, including the position for which you wish to be considered and a complete salary history, to:

DIRECTOR, SOFTWARE PRODUCTS DIVISION



### APPLIED DATA RESEARCH

Route 206 Center, CN-8

Princeton, New Jersey 08540

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### PORTLAND, OREGON NCR — NEAT/3 PROGRAMMER/ ANALYST

New and progressive Bank Data Center has immediate need for programmer/analysts with strong NEAT/3 background. Banking and/or CIF background helpful. Send resume to Western BancData Center,

P.O. Box 20992, Portland, Ore., 97220  
Phone - 503-256-9522.

### DATA PROCESSING OPPORTUNITIES

Two immediate openings - one in programming management and one position as a Senior Programmer/Analyst. Excellent opportunities with highly competitive salaries and excellent fringe benefits. Work with the development of computer programs in the areas of distribution, marketing information, and business applications using RSTS/E operating systems for PDP 11/70 computers.

Degree and considerable experience in programming, operations, and analysis or equivalent background is required. Both positions require demonstrated management ability. Experience in RSTS/E systems helpful.

Please submit resume complete with references by June 29, 1979 to  
CW Box 1958  
797 Washington St.  
Newton, MA 02160



# Your Career Path Leads To Honeywell-Phoenix

Located in the heart of Arizona, not only will you have the opportunity to join the staff of a company that is the nucleus of tomorrow's computer technology, but you will also have the chance to live in an area that has everything to offer in recreational facilities

with perfect weather in which to enjoy them.

Therefore, the people we're looking for must be familiar with today's processes and still be innovative enough to develop tomorrow's systems.

## Software positions are currently available in the following areas:

- Advanced Operating Systems Design & Development (GCOS, Multics, etc.)
- Unified File Access System (Logical I/O)
- Utility Systems Development and Test
- Programming Languages — Compilers & Supporting Software
- Application Development Systems
- Transaction Driven Systems
- Software Documentation Specialist
- Data Base & File Management Systems
- Integrated Data Store II — A Data Base Management System Based Upon CODASYL Specifications
- Distributed Processing and Networking
- Language Systems Development
- Communications System Software
- Software System Testing
- Internal Business Systems

The roads lead in many directions in today's world. If you're ready to take one that will be the most beneficial to you, send your resume with salary requirements in complete confidence to:

**HONEYWELL LARGE INFORMATION SYSTEMS**  
Manager, Recruitment & Placement  
P.O. Box 6000  
Mail Station Y  
Phoenix, AZ 85005



# Honeywell

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# Data Processing Professionals

## Interviews at NCC June 3-7 in NYC

### Virginia - Maryland - DC Offices

Come to a corporation where your abilities contribute directly to your own success. ManTech of New Jersey Corporation, with over ten years of Engineering and Management consulting experience, is in the midst of an unprecedented growth period. Our progressive and innovative data processing applications require self-motivated, skilled professionals to utilize IBM 370/168, VAX 11/780, PDP 11 and other minicomputers.

Current needs include:

- LARGE SCALE DATA BASE ANALYSTS
- SYSTEMS ANALYSTS
- PROGRAMMER ANALYSTS (COBOL, FORTRAN, BASIC, ASSEMBLY)
- SOFTWARE ENGINEERS
- COMPUTER-AIDED DESIGN PROGRAMMER ANALYSTS
- COMPUTER GRAPHICS PROGRAMMER ANALYSTS

Appropriate degrees are desirable but experience may be substituted. A minimum of 2 years experience is necessary for all positions.

To schedule appointments for interviews in NYC during the NCC, call Mr. R. O. Stewart June 3-7 at:

(212) 247-2800

If an interview is inconvenient at this time, send your resume to R. O. Stewart, Manager Corporate Recruiting, MANTECH OF NEW JERSEY CORPORATION, 6110 Executive Blvd., Rockville MD 20852. Affirmative Action/Equal Opportunity Employer - Women - Minorities - Veterans - Handicapped Urged To Apply.

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Haverford, PA 19041  
(215) 565-2920

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If you've ever dealt with so-called placement specialists who have merely skimmed the surface of your field, you know what to avoid. Enter the Jarvis Walker Group. Where placement specialists get involved in what YOU'RE involved in . . . data processing careers. See how and why. See what such involvement can mean. Just call or write the appropriate office. Everything is confidential.

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N.J. - 349 E. Northfield Rd, Livingston 07039 (201) 994-3773  
Calif. - 11222 S. La Cienega Blvd, Inglewood 90304 (213) 670-7353

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group

# EDP PROFESSIONALS

Get Involved in the **MARKETING** and **DEVELOPMENT** of a unique line of high technology products

with **DATAPOINT**  
The Leader in Dispersed Data Processing.

Interview with us while at the NCC in New York.

We're branching out into new fields, developing new systems and revolutionizing our industry. As our business expands, so must our staff, therefore, we are looking for qualified individuals to fill the following positions:

### MARKETING & MARKETING SUPPORT

#### Opportunities in San Antonio

##### RESEARCH ANALYST

You will support new product development.

##### COMPETITIVE ANALYST

You will work on a broad variety of business planning functions.

##### PRODUCT MANAGERS/PRODUCT SPECIALISTS

You will be involved in product analysis and planning and every aspect of product development.

#### Opportunities Across the Country

##### SYSTEMS ENGINEERS

We need experienced engineers for software design and troubleshooting.

##### SYSTEMS MANAGER

You will be involved in software design and support activities.

##### SALES REPRESENTATIVES

You should have computer sales experience and will be involved with customer problem resolution, preparation and presentation of proposals and reports. Travel will be necessary.

Contact us at our New York office during your stay for the NCC. Call Chuck Simoncini (212) 826-9510, Datapoint Corp., One Citicorp Center 153 E. 53rd St., 3rd Floor, New York NY or send your resume to Richard Smith, Datapoint Corporation, 9725 Datapoint Drive, Mail Station M84, San Antonio, Texas 78284.

### COMMUNICATIONS SOFTWARE DEVELOPMENT

You will be involved in communications software development and implementation, specifically, with one or more of the following: IBM 360/370, SDC, SNA, X25, 3780, 3270 Interactive or HASP.

### SOFTWARE CERTIFICATION

You will need knowledge of operating systems, languages, or communications emulators and you will test for software certifications standards.

### SOFTWARE SUPPORT

Performance of your duties will require knowledge of communications software with emphasis on 2780, 3780, 3270 or HASP.

### SOFTWARE DEVELOPMENT

You will be involved in the design and development of internal software products. Specific knowledge in at least one of the following areas is required: Operating Systems, Languages, or Data Base Design.

Candidates should contact Mr. Robert Harris at the Barbizon Plaza Hotel, 106 Central Park South, New York, NY during the National Computer Conference or send resume to Datapoint Corporation, 9725 Datapoint Dr., Mail Station N60, San Antonio, Texas 78284.

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"The Leader in Dispersed Data Processing"™

## NCC IMMEDIATE INTERVIEWS HIRING MANAGERS

### ST. MORITZ HOTEL-3 BLOCKS AWAY, 50 CENTRAL PARK SOUTH

Our client is a leader in developing total mini/micro-based financial systems for the commercial/financial communities. Located in a convenient NYC suburb, our client offers competitive salaries, excellent fringes, and exciting careers in the following areas:

- INTERNATIONAL TECHNICAL MARKETING SUPPORT
- SYSTEMS ENGINEERS
- SOFTWARE QUALITY ASSURANCE
- PROGRAM MANAGERS
- SOFTWARE DEVELOPMENT
- MANAGER SOFTWARE PUBLICATIONS
- INSTRUCTORS

**SALARIES TO MID \$30's**

Visit us at the ST. MORITZ, 50 Central Park South, June 4, Monday 1 PM - 9 PM, June 5, 6, 7, Tuesday - Thursday, 9 AM - 9 PM.

St. Moritz Tele: 759-6767



**MANAGEMENT  
ADVISORY  
SERVICES, INC.**

If unable to attend send resume to:  
16 New England Executive Park,  
Burlington, MA 01803

Our client is an equal opportunity employer



# SOFTWARE OPPORTUNITIES

The Defense and Space Systems Group of TRW is one of the most advanced high technology facilities in the world. Here, creative imagination and implementation come full circle. Our products, from the smallest micro circuit to the largest satellite, are designed by top notch teams of professionals. At a company called TRW, we offer an excellent Flexible Benefits Plan, an interesting and challenging environment, and a beautiful Southern California location. Now is your opportunity to move into a climate where innovation can thrive while your growth continues. Immediate positions are available for the following qualified individuals.

## **CDC CYBER 174/74 OPERATING SYSTEMS PROGRAMMERS**

Operating system programmers to maintain and modify system to accommodate new developments in hardware and technical advances in software.

## **COMPUTER SCIENTISTS**

Design and write formal descriptions of computer language. Will be involved in compiler test methodology, computer system modeling, automatic programming, and the semantics of parallel computation.

## **ENGINEERS/ COMPUTER SCIENTISTS**

Perform system architecture design, hardware/software tradeoffs, executive system design and interactive graphics.

## **EXECUTIVE CONTROL SOFTWARE**

Programmer/Analyst to design and develop the operating systems for the central computer & interfacing minis.

## **GRAPHIC SYSTEMS PROGRAMMERS**

Design and implementation of interactive color graphics software to run in an 8086 Microprocessor.

## **GRAPHICS SYSTEMS PROGRAMMER ANALYSTS**

Design and implementation of systems and applications software for communication and information processing employing color and interactive graphics.

## **GROUND TERMINAL SUPPORT SOFTWARE**

Programmer/Analysts to design and develop ground operations control center software.

## **INTEGRATION TESTERS**

Generate and execute test plans for integration of software subcomponents into process.

## **MINICOMPUTER PROGRAMMER ANALYSTS**

Design, develop, maintain and document software for processing telemetry, radar and scientific sensor data.

## **MINICOMPUTER SYSTEMS ANALYSTS**

Perform analysis and design of hardware and software for networking and communications systems.

## **MINI/MICRO COMPUTER SYSTEMS ANALYSTS**

Develop enhancements to the DEC PDP 11/70 O/S and design and develop a real-time executive for the Intel 8086 Micro-processor.

## **PDP 11/70 & 11/34 OPERATING SYSTEMS PROGRAMMERS**

Maintain systems operating under RSX-11, identify and document system errors for vendor correction, consult with programmers developing real-time software to run on system.

## **PROCESS DESIGNERS**

Perform requirements analysis and allocation and design tradeoffs. Define process threads and data and control interfaces. Design data base structures.

## **REAL TIME PROGRAMMERS**

Perform requirements analysis, design, implementation and integration of real-time software.

## **REAL TIME SOFTWARE DEVELOPMENT**

Design and test critical airborne software including executive, communications, guidance, navigation and control functions.

## **SENIOR SYSTEMS PROGRAMMERS**

Requires knowledge of IBM JCL, assembly language and systems internals to support IBM duplex 370/158 including system generation, job entry subsystems, TSO, and performance.

Supporting Communications software for 300/158 environment. Will install, maintain and debug VTAM, BTAM, TCAM, NCP and other related software which interfaces with IMS and TSO on-line systems.

## **SIMULATION DEVELOPMENT**

Design and develop functional, scientific and interpretive simulations and diagnostic emulators, real-time simulation and interactive graphics.

## **SOFTWARE SYSTEMS ENGINEERS**

Will engage in software systems analysis, requirements analysis, test planning, and simulation development.

## **SYSTEM ANALYSTS**

To perform system analysis and trade-off studies, algorithm design and evaluation.

## **SYSTEMS PROGRAMMERS**

To maintain and modify vendor installed and TRW developed operating systems. Requires assembly and high level languages.

## **SYSTEMS PROGRAMMERS**

Develop compilers, DBM systems, language preprocessors, test tools, real-time interactive graphic systems emulation and large scale scientific programs.

## **SYSTEM/SOFTWARE/ DESIGN ENGINEERS**

Perform requirements analysis, system simulation, B-Spec preparation, hardware/software trade studies and software design.

## **TACTICAL SYSTEM ENGINEERS/ANALYSTS**

Perform requirements and tactics/doctrinal analysis, multisensor correlation and modeling, software development and discrete event simulations.

## **UNIVAC 1110 OPERATING SYSTEMS PROGRAMMERS**

Maintain Univac OS, 1100 V33Rs operating system including identifying system problems, providing adequate documentation to the vendor to produce corrections.

## **USER SERVICES SCHEDULING SOFTWARE**

Systems Software Analysts with background in data base design, computer-to-computer communications, hardware protocol interfaces. Must be able to define general constructs not sensitive to detail changes.

Top professionals are known by the company they keep. Especially when the company is TRW, an equal opportunity employer offering excellent salaries and an outstanding Flexible Benefits Plan. For immediate consideration:

Forward your resume to:  
**BOB CHAMBERS, DEPT. CW64  
BLDG. E1, RM 4037  
ONE SPACE PARK  
REDONDO BEACH, CA 90278**

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**DEFENSE AND SPACE SYSTEMS GROUP**



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## Data Communications

Codex is a recognized leader in high performance, high speed data communications products and systems.

See us at the  
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Stop in and see how you can be part of our 40% annual growth rate in the industry of the 1980's.

Come see us and find out about our new Distributed Network Control System, a technical achievement so advanced it demonstrates the pace at which we're moving.

If you don't catch us at the show, write for literature describing our company and its opportunities.

Write: **Employment Manager**  
**Codex Corporation**  
20 Cabot Boulevard  
Mansfield, MA 02048

**codex**  
corporation

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### ENGINEERING

## SYSTEMS ENGINEERS...

Leadership careers  
where you make  
the difference.

Storage Technology Corporation is only 10 years old and already the world's largest manufacturer of high density tape storage products and a major manufacturer of disk subsystems.

We've built our reputation on innovation and advanced technology because we encourage the independent creative contribution of every one of our people. Last year we went over 300 million in revenues, up from 162 million just a year earlier, so we know our philosophy works.

Systems Engineers with STC consult and provide technical support to field sales and marketing. You set your own schedules and prepare your own presentations. And we may have a good spot for you right where you are now.

Requirements are:

- A college degree (or equivalent experience)
- Knowledge of the internals of one or more IBM virtual operating system (MVS, SVS, VSI, VM, DOS/VSE)
- High level of proficiency in ALC
- Knowledge of one or more other programming languages (FORTRAN, COBOL, PL/1)
- Ability to write and present technical materials clearly and effectively

If you have these credentials, we have an exceptional career for you at STC.

For fastest consideration with absolute confidentiality send your resume to:

Bill Waibel Dept. CW/6-4 MD-3K

**STORAGE TECHNOLOGY CORPORATION**  
2270 South 88th Street  
Louisville, CO 80027

OR

Give Bill a call TOLL-FREE at 800-525-2940 ext. 6551 or Fred Moore ext. 3008 for further information. We have a lot to say that you'd like to hear.

An equal opportunity employer



## Computer Professionals

Deere & Company, a leading manufacturer of agricultural equipment, has openings for the following positions:

### SYSTEMS ANALYSTS

You must have a minimum of 2 years experience, including IMS and COBOL, in an IBM environment, preferably in manufacturing areas. Responsibilities will be varied.

### PROGRAMMERS

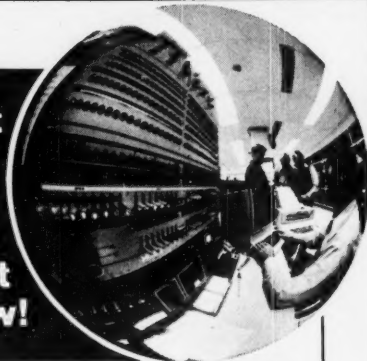
Prefer a minimum of 2 years experience including IMS with IBM equipment plus a knowledge of one or more of the following languages: COBOL, PL/1, and FORTRAN.

We offer qualified candidates excellent starting salaries and comprehensive company-paid benefits including paid relocation to Iowa. For consideration, direct your inquiry with salary history to:



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Dept. PE-14  
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The brightest  
future in  
software, hardware &  
systems engineering  
offers the biggest  
rewards right now!



### Here's your chance to join the world leader.

Our client, a "Fortune 50" and the world leader in command control and communications systems, has retained us to identify and recommend qualified degreed software and hardware systems engineers for the profession's most exciting and challenging projects.

Opportunities include design and development of systems for voice, data and packet switching, intelligence needs, signal processing and data base management.

### You'll live in one of the nation's most exciting locations!

These unique career opportunities also offer you a lifestyle ambience second to none—in a choice New Jersey location less than one hour from the ocean... central to the East's great cities... with outstanding housing, schools, medical, shopping, cultural and recreational facilities.

### Meet with our client—in person!

Send your resume today or call collect to Ron Naftal at 215-561-6300—Mon. thru Fri. (or 609-267-1746 all other times) to arrange to attend our special career conference to be held in your area, or mail this coupon.

## FOX-MORRIS personnel consultants

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### You'll earn up to \$32,000 (managers up to \$50,000)

The compensation package which our client offers ranks among the industry's finest—with starting salaries ranging to \$32,000 for staff engineers and to \$50,000 for experienced managers.

In addition, you'll receive health insurance, fully paid life insurance, a retirement plan and many other benefits. And employment and relocation costs are fully paid.

### ... And here are two special added rewards!

1. To help you prepare for your client interview, we'll immediately send you our free, comprehensive "Career Advancement" Kit (send coupon below).

2. The day you begin work we'll give you one of the world's finest Color TVs—free! (The TV's also yours for recommending others successfully hired!)



### OK! I'm interested in the best!

Dear Mr. Naftal:

Contact me, I'd like

☐ to attend your career conference.

I've enclosed my resume.

☐ Send me your Kit on "Career Advancement."

Name \_\_\_\_\_

Address \_\_\_\_\_

City & State \_\_\_\_\_

Telephone \_\_\_\_\_

Send to: Fox Morris, 1500 Chestnut St., Phila., PA 19102

## PROGRAMMER/ANALYSTS Be Seen By The Best...

M.I.S. International has grown as a successful, highly regarded computer systems organization because of creative and ambitious professionals looking for a true challenge. We offer broad and diversified product line opportunities in **Manufacturing Systems, Laboratory Data, Acquisition Systems, Quality Audit Systems and Emission Systems.** In the long run, we believe the only question is:

### IF YOU ARE THE BEST, WHY NOT WORK FOR THE BEST?

Because of the successful expansion of our services, we now have immediate openings in **Cleveland, Ohio; New York City; Washington, D.C.;** as well as **Southeastern Michigan** for:

- Mini/Micro Computer Systems Engineers and Real-Time Programmers with Systems and Programming experience in: IBM-S/1, PDP 11, Motorola G680, V74...
- Commercial Programmer/Analysts for IBM, Honeywell, Univac and Burroughs Systems.

We have an excellent starting salary for those with demonstrated expertise; regular increases are based on individual merit. Our benefit package is second to none, and relocation costs are provided. If you think that individual effort is important, and want to work for a company that agrees with you, call June 4-6: Mr. M. Bahn/S. Russo at 212-247-4000; after the show, call collect or send your resume to Mr. Ed Lyons.

**MIS**  
INTERNATIONAL INC.  
"A Total Systems Company"

31350 Smith Road, Room C-51  
Romulus, Michigan 48174

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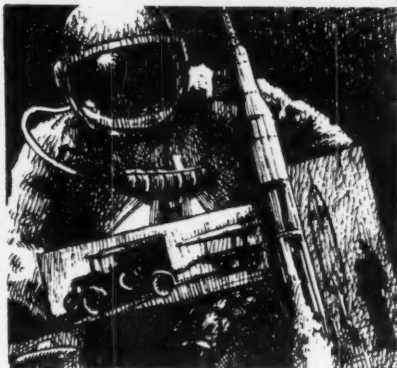
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CSC

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A continuous record of growth and achievement and an unmatched reputation for excellence is what we're all about at Computer Sciences Corporation. With over 11,000 staff our accomplishments span many disciplines, solving a wide range of problems and making us the largest independent organization in the information sciences field. We can offer you a career with a future and room to expand your expertise to its fullest potential.

Our System Sciences Division performs on major support and development projects in the areas of design, software analysis and implementation. We're proud of an atmosphere that is conducive to finding solutions to complex software problems CREATIVELY—and our continued success depends on maintaining this kind of innovative environment.

Immediate requirements in support of projects in Mission Support, Science and Applications and Goddard Real-Time Systems at the NASA Goddard Space Flight Center include the following:

## Senior Engineer

MS/PhD in EE or Computer Sciences, 9+ years' hardware and software design experience in real-time systems computer/communications networks; to do formulation of systems concepts and development and enhancement of new and existing systems using micro, mini and large scale computers.

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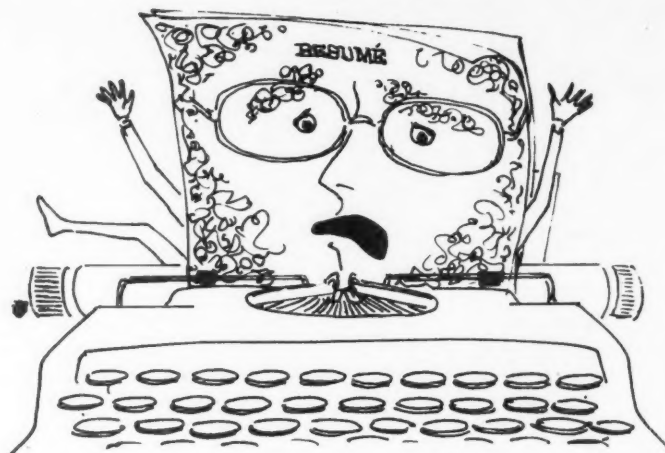
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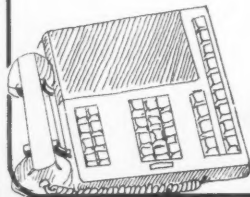
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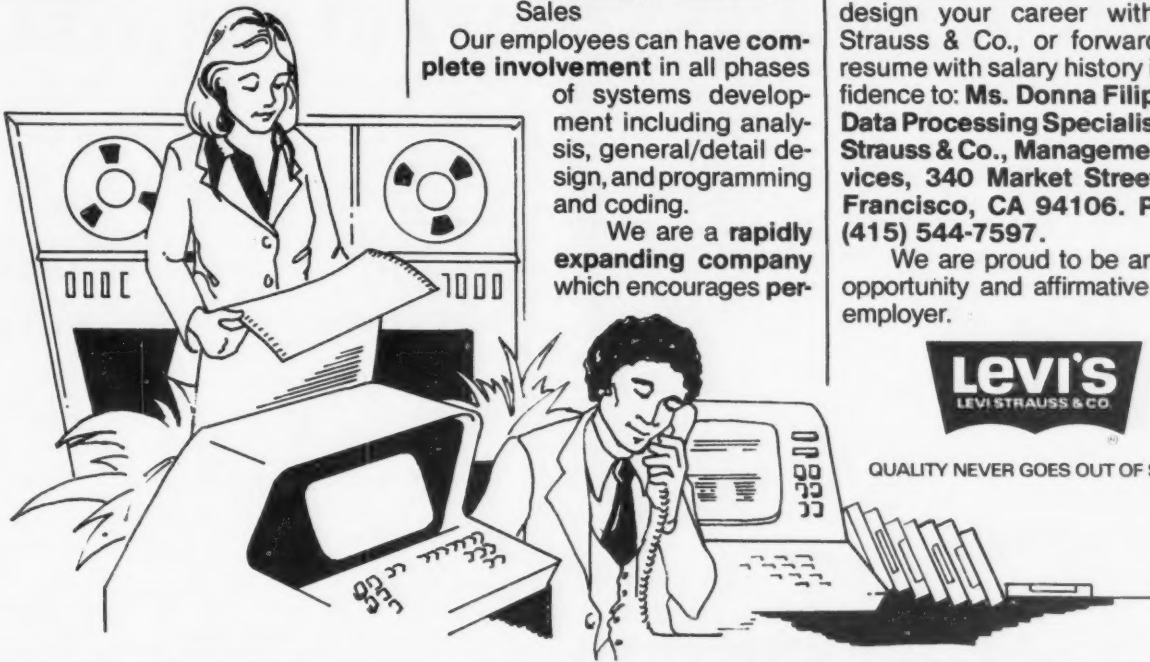
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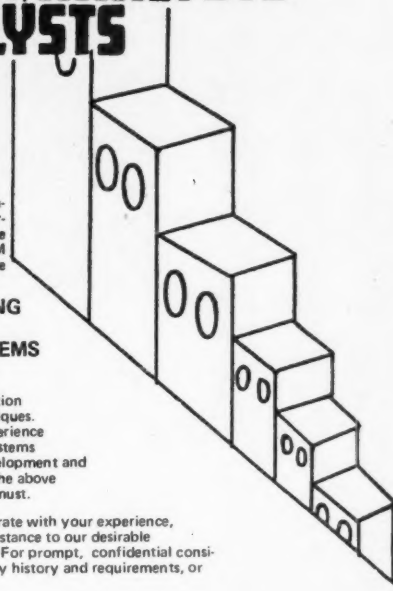
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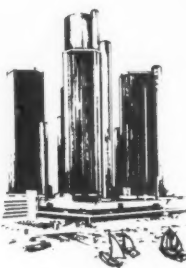
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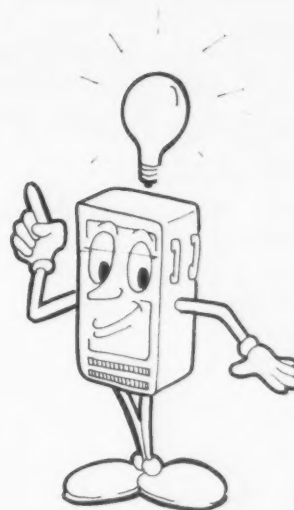
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- Interpreters
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Mark Alft Helen McMahon Ron Englebrecht Dwight Ensminger Ernest McNair

We'll introduce you to people like: Design Engineer **Mark Alft** who regularly visits NCR's overseas operations; or Programmer **Helen McMahon** who likes working with advanced language compilers; or Hardware Manager **Ron Englebrecht** who's a gentleman farmer weekends; or Programmer **Dwight Ensminger** who's earning an MBA at a local university; or Programmer Analyst **Ernest McNair** who likes varied assignments, and having time to do a job right.

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#### INTER-NETWORK INTERFACES

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The professionals we are seeking to become part of the CHALLENGE of the 80's should have 3 or more years experience in systems programming and systems analysis. Your experience should be characterized by Systems Design and Assembly Level Programming in one of the following functional areas: Operating Systems Internals, Communications Drivers, Network Control, Language Translators, Applications Access Methods, Real-time Applications, or Diagnostics. However, we are more interested in the quality of your systems experience than in a specific functional fit.

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Or send your resume and salary history, in complete confidence, to him at: USDPG, NCR Corporation, Dept. G-50 Dayton, Ohio 45479.

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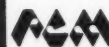
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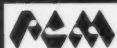
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1. I expect to be eligible for the earned income credit for 1979. I have no other certificate in effect with any other current employer, and I choose to receive advance payment of the earned income credit. Yes ☒ No ☐

2. If you are not married, check "No". If you are married, does your spouse have a certificate in effect for 1979 with any employer? Yes ☐ No ☒

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Signature Wayne Martin Wilson Date June 15, 1979

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REGULAR	86.87	390.00	5,070.00	FEDERAL TAX	42.50	552.50	
EIC EARNINGS		18.00		FICA	23.90	310.70	
				STATE TAXES	8.50	110.50	
				LIFE INSURANCE	1.30	16.80	
				HOS. INSURANCE	8.00	104.00	
				UNION DUES	2.50	32.50	

STATEMENT OF EARNINGS AND DEDUCTIONS - DETACH AND RETAIN FOR YOUR RECORDS



For further information, contact Joe Payne  
at 404-262-2376, or return this coupon

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone \_\_\_\_\_ Computer Model \_\_\_\_\_

I am interested in MSA's:  
☐ PAYROLL ACCOUNTING SYSTEM  
☐ PERSONNEL MANAGEMENT AND REPORTING SYSTEM  
☐ HUMAN RESOURCE SYSTEM  
☐ ALLTAX™  
☐ GENERAL LEDGER / FICS SYSTEM  
☐ FINANCIAL FORECASTING AND MODELING SYSTEM

☐ FIXED ASSETS ACCOUNTING SYSTEM  
☐ ACCOUNTS PAYABLE SYSTEM  
☐ SUPPLIES INVENTORY CONTROL AND PURCHASING SYSTEM  
☐ ACCOUNTS RECEIVABLE SYSTEM  
☐ PROCUREMENT MATCHING SYSTEM  
☐ BIG 8 LITERATURE

Already complying with EIC.



